

March 1964

culture

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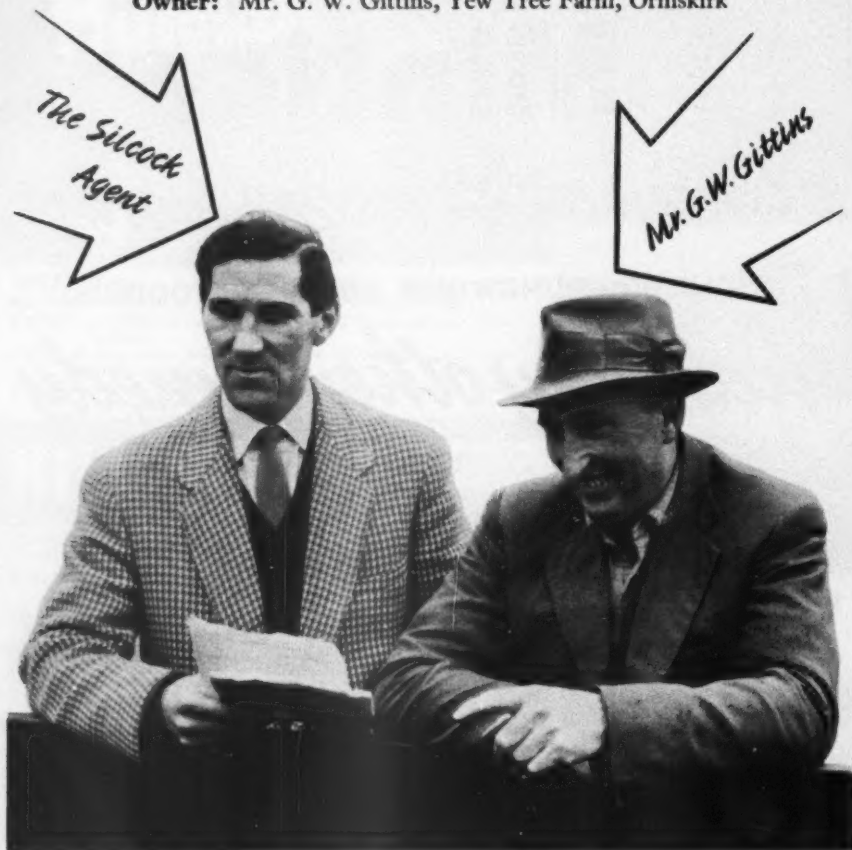
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Agriculture

VOLUME 71 • NUMBER 3 • MARCH 1964

Editorial Offices

Ministry of Agriculture, Fisheries and Food

Whitehall Place, London S.W.1. Trafalgar 7711

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THE BOWEN WAY

Finishing the crutch

WOOL CLIP



Shearing time varies quite a bit, even within the same locality. Thus early-breeding flocks come under the clippers after the lambs are weaned, but in March- and April-lambing flocks shearing must be done before the lambs reach weaning age. Hoggets may be shorn in March and April in the south of England prior to immediate slaughter. Under normal conditions ewes will be shorn in June, perhaps May in the south. For hill sheep and in northern flocks, shearing will be a month or two later. Look for the 'ripeness' of the fleece, i.e., when the yolk has risen in the wool.

Sheep should be fasted before shearing; a sheep may well die if handled with a distended rumen. Two common faults in sheep shearing are injury to the skin and spoiling the fleece by double-cutting; the latter occurs when a first cut leaves too much wool on the skin, so requiring a second cut, which of course reduces the length of the staple. It shouldn't be necessary to counsel care of the genital organs and teats, but such injury is not uncommon.

Choose a clean, dry surface, i.e., a tarpaulin or wooden floor—never grass—so that the fleece doesn't take up dirt and droppings. Shear when the wool is dry, even if you have to house the animals overnight; rolled wet wool won't store. And use a band of neck wool to tie the fleece, not binder or baler twine.

HOW WELL DO OUR CATTLE AUCTION MARKETS WORK?

From a study made at Rugby, where between 16,000 and 20,000 fat cattle have been certified annually over the last few years, Mr. Edmunds uses a 'scalpel' as well as a pen

Anatomy of a Beef Cattle Auction

Henry Edmunds

It was not until the middle of last century that farmers changed from the leisurely buying and selling, with its long drawn out individual bargaining, to the more impersonal swiftness of the auction mart. The two events to which the great development of auctions was due were the repeal (1845) of a tax on auction sales and the general expansion of the national railway system.

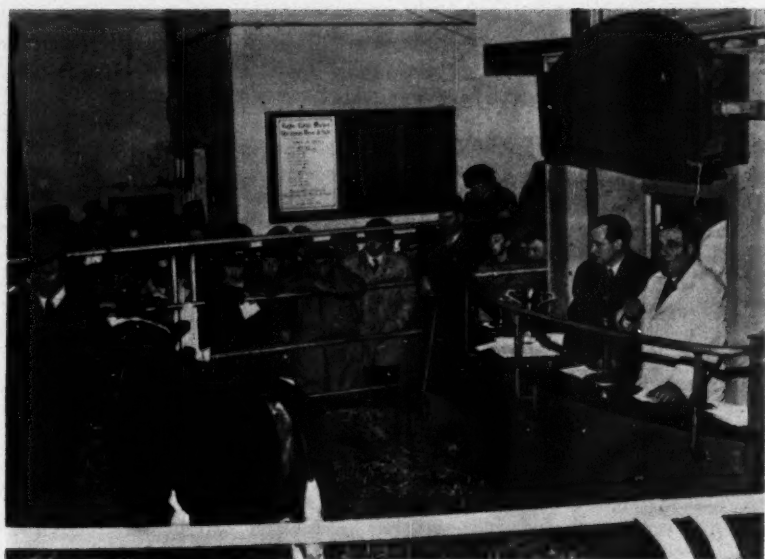
Although there are now distinct trends towards other forms of cattle marketing, e.g., groups and deadweight, auctions are still the major force. Over England and Wales from April, 1962, to March, 1963, 1½ million live cattle came under the hammer at some 450 auction markets.

By any standard, their market value would be big business, ranging from £50 to £100 million, excluding deficiency payments. Rugby, the subject of this article, is one of our bigger beef markets, where 16-20,000 fat cattle were certified annually for the Fatstock Guarantee payment over the last few years. The problem was how to assess its efficiency.

Concept of a perfect market

The classical definition of a perfect market is a place where (1) sellers and buyers meet in large numbers, (2) where seller and buyer come together by chance and not by preference or collusion, (3) where there is a homogeneous product and (4) where both parties are aware of price movements occurring elsewhere.

Rugby, in common with almost all auctions, falls short in one of these criteria. The product—beef cattle—is far from homogeneous, even for



Christmas, 1963, sale at Rugby. An illuminated sign giving the lot number and live weight of the animal being sold is above the auctioneer's head. In the rostrum are Councillor A. Taylor, J.P., Mayor of Rugby, and Mr. R. H. M. Burton

animals within the same certified grade and weight range. Neither is there any way of knowing precisely how aware each seller and buyer is of prevailing prices, but certainly some farmer-sellers are extremely sensitive, making full use of all sources of market intelligence.

But the big question relates to seller and buyer strength. Are there enough of each in relation to numbers of cattle on offer each week? To attempt an analysis, one market was selected at random each month from October, 1962, to September, 1963.

Sellers and Buyers

Date of Auction	No. Cattle	Sellers		Buyers		Range per buyer
		No.	Average Cattle per seller	No.	Average Cattle per buyer	
22 Oct. 1962	592	81	7.3	66	8.9	Data not available
12 Nov.	476	79	6.0	61	7.8	
3 Dec.	555	86	6.4	61	9.1	
28 Jan. 1963	426	74	5.8	48	8.9	1-60
11 Feb.	289	60	4.8	49	5.9	1-50
4 Mar.	161	42	3.8	47	3.4	1-23
15 Apr. (Easter Mon.)	96	27	3.6	27	3.6	1-24
13 May	164	45	3.6	58	2.8	1-16
24 June	397	60	6.6	49	8.1	1-62
8 July	270	52	5.2	41	6.6	1-47
26 Aug.	476	70	6.8	56	8.5	1-61
30 Sept.	606	78	7.8	56	10.8	1-79
	4,508	754	5.9	619	7.2	

Cattle entries are at a peak in September, with the trough in April and May, but excluding the abnormal 15th April (Easter Monday), seller numbers vary from 42 to 86. Buyer strength is much more constant (41-66), despite wide variations in numbers of cattle for sale from month to month.

Mostly small buyers

Next look at a breakdown of buyers and the relative purchasing power of three groups.

Relationship between Buyers at 9 Sales (1963)

	<i>Buyers</i>	<i>No.</i>	<i>per cent</i>	<i>No. cattle bought</i>	<i>per cent</i>
Small	(1-2 cattle)	231	53.6	316	10.9
Medium	(3-9 cattle)	122	28.3	754	26.2
Large	(10+ cattle)	78	18.1	1,815	62.9

Therefore, in this series of sales, slightly over half the buyers were small butchers who bought about one-tenth of the cattle on offer. But the proportion they bought at single sales varied enormously according to the numbers of cattle available. Thus when cattle numbers were low (13 May) they took 31.1 per cent compared, with 4.8 per cent when entries were high (30 September).

The Rugby picture is therefore one where small buyers predominate at each sale; they are regular attenders and take a third of the cattle when entries are low and a twentieth when entries are high. While it is desirable to have small and big buyers, it is the latter on whom the market really depends, taking as they do from a quarter to three-quarters of the total cattle. Their flexible buying strength is vital, especially at peak periods. Furthermore, this flexibility extends to diverse types of cattle, for there appears to be a good market for all weights. Most fall into the 8-10 cwt group, but there are substantial numbers at 11 cwt and over. This perhaps is a reflection of the Midlands as a consuming area, where side by side with the family butcher are the many large industrial canteens. Wholesalers cater for all types of consumers, and in order to fulfil their needs they tend to concentrate on large auctions.

Rate of selling

Such men obviously wish to conduct their business as expeditiously as possible and it may be that the rate of selling per hour influences prices. Presumably either extreme is bad—too slow or too fast.

In the U.S.A. certain Florida auctioneers reach an average of 150 fat cattle per hour. By comparison, the average rate of selling at Rugby on the dates recorded in the table on p. 103 was 132 single animals per hour, with a range from 94 (4 March) to 149 (24 June). The tendency was to sell at a slower rate when entries were low and faster when they were high. It is easier to hold the attention of buyers if the animals are being put through quickly.

Position in sale

There is a widely held belief amongst farmers that the beginning and end of a sale are weak selling positions; the favoured place is somewhere near the end of the first quarter. So strongly is this held that balloting for sale order

is common practice in many auctions over the country. It happens at Rugby too, for when entries are high a draw is made to decide the three owners whose cattle are to be offered first. Should the cattle not be sold, those owners have the right for their cattle to return to the sale-ring in their proper lot number order.

We know that there is a distinct tendency for suckled calf prices to rise after the first hour and to fall off at the end. And this was tested out at Rugby, for it has considerable practical significance to local farmers and transport organizations. To get fat cattle into the market at 7 a.m., a favoured time, means that animals have to be gathered on farms around five o'clock for collection at six. Thereafter some may spend at least four to five hours in the pens before sale.

An analysis of all Grade I steers sold at the 12 sales in the table on p. 103, when each sale was divided into quarter periods, is now given.

Average Prices of Grade I Steers at 12 Sales

Position in sale	No. of steers	Average prices (live cwt)	
		s.	d.
1st quarter	401	142	7
2nd quarter	349	142	0
3rd quarter	362	141	8
4th quarter	191	141	2

These figures seem to support, if only slightly, farmers' belief in the favoured place in the auction. Balancing this against the inconvenience of the present early cattle collection and possible heavier liveweight losses, it may well be that in practice there is little to choose between each quarter of the sales.

But there was a good deal of variation from sale to sale, and this would influence individual farmer's returns, according to which sales they happened to patronize.

Figures taken suggest that farmers who sell cattle every week (and they are few) can expect average prices from whatever part of the sale they happen to be in. But those who sell at irregular intervals can expect greater fluctuations—either up or down—depending on the sale or sales at which they offer their stock.

Auction management

The analysis attempted here is far from complete; it merely touches the fringe of the problem. Because of the magnitude of the auction business over the country as a whole, influencing as it does the fortunes of farmers and auctioneers as well as the Treasury, efficient markets are clearly desirable. The problem is to devise yardsticks or standards by which any market can be measured.

Buyer strength, rate of selling and position in sale order have been referred to. There are, of course, a host of other factors which may also influence prices in individual markets, but these can only be studied locally. Just as surveys indicate that farm businesses vary widely between farm and farm (even when the same commodity is produced), so markets are likely to vary in efficiency. Farm management analyses are now so commonplace and are of undeniable value to the participants; one wonders whether a similar sort of service would be equally advantageous to auctioneers.

'Auction management' has made some progress in certain co-operatively-managed markets in the U.S.A. An animal unit system is used (1 head of cattle, 2 calves, 4 pigs, 5 sheep) to obtain costs and receipts per animal, and expenses itemized under such headings as yard labour, office costs, advertising, etc. It's worth thinking about.

This study was possible only through the close co-operation of Mr. R. H. M. Burton, O.B.E., F.A.I., Chairman, Messrs. Rugby Livestock Sales Ltd., who placed his records at my disposal. Thanks are also due to Mr. W. B. Fischer, Divisional Fatstock Officer, and to Dr. D. W. Empson, who advised on statistical matters.

Henry Edmunds, B.Sc., took his degree at the University College of Wales, Aberystwyth, and served in various capacities with the Glamorgan Agricultural Executive Committee before joining the N.A.A.S. in 1946. From 1959-61 he was Agricultural Attaché at the British Embassy in Washington, and is now County Advisory Officer for Warwickshire.

THE WORM BURDEN OF PASTURE.

WHAT RISKS DO YOUR CATTLE AND SHEEP RUN?

J. F. MICHEL, M.A., Dip. Agr. Sci.,

Ministry's Veterinary Laboratory, Weybridge

2

Helminthiasis

and grazing management

The first of these two articles, which appeared in last month's issue of this Journal, showed the effect of several aspects of management on helminth infection to be limited or variable. The view that measures of limited effect imposed over a long period can be of value is itself based on an epidemiological theory which is now seen to be inadequate. The simple relationship between the number of larvae ingested, the worm burden resulting and the subsequent rate at which worm eggs are voided in the dung obtains, in the case of most infections, for only a short time after first exposure to infection; it is quickly modified by a variety of phenomena of acquired resistance.

These affect the establishment, development, survival and fecundity of the worms in the host, and different species of worms show marked differences in these phenomena.

The relationship between the number of worm eggs in the dung falling on to a pasture and the number of infective larvae appearing on the herbage is also neither simple nor constant. The rate of development is determined by a number of factors, among which temperature is important. It proceeds best under one set of conditions, while survival of the infective larvae is favoured by quite different conditions. The fluctuations in the infestation on the herbage of a pasture grazed by infected animals are not therefore a mere reflection of the number of eggs passing on to it.

Host relationships

Dangerous infections will be acquired when the animals are susceptible and the concentration of larvae on the herbage which they are grazing is high. The periods when both these conditions are met are likely, if they occur at all, to be short. It is clear that measures of limited effect continued for a long time will show a very poor return for the effort expended, and it may not be wrong to regard factors and practices such as those discussed in the earlier article as having little relevance to the incidence or severity of parasitic disease.

It would be much more advantageous to apply more vigorous measures at the correct moment, but this requires a knowledge of epidemiology sufficient to permit some prediction of the course of infections in the stock and on the pasture. Since the biology and host parasite relationships of each species of parasite are different, such information becomes available only slowly.

The characteristics of each parasite most relevant to the design of control measures are how quickly and at what seasons the larvae on the pasture develop to the infective stage and how quickly, and after what experience of infection, the animals become resistant. These factors must be considered in the context of a number of different situations. Either the young animals have to run with their dams, who are likely to be a source of infection, or they can be reared on their own. If they can be reared on their own, they must either at some subsequent stage graze together with older animals, or on pastures which they have occupied, or else their life on the farm is to be so short that they need never graze with older stock.

With such differences between species of parasites and such different husbandry situations it is vain to seek to formulate a set of universally applicable precepts on the control of parasitic worms. But specific problems may have their own solution, some species lending themselves to control more readily than others. One or two examples may illustrate the possibilities.

Nematodirus

An outstanding example of a parasite whose characteristics make it readily susceptible to control is provided by the two species of *Nematodirus* which are common in sheep, and which appear to have become troublesome in the last ten years or so. Lambs quickly become resistant to this worm, both as a result of infection and as a consequence of increasing age, and they do not carry the worms for very long. The development from egg to infective

larva is very slow, so that many of the eggs deposited on the pasture in spring do not become available as infective larvae on the herbage until the spring of the following year. Thus heavily infected grazing and susceptible animals (in this case the new crop of lambs) occur together for only a short time. All that is needed for control is to avoid letting the young lambs graze in spring and early summer where lambs grazed in the previous year.

Husk

Husk in calves presents a very different picture. Here also resistance to reinfection develops very quickly, though only in consequence of a sufficient infection. The development of the larvae on the pasture is extremely rapid, and infective larvae can appear on the herbage in less than a week after infected calves are put on the pasture. Moreover, given suitable conditions, a very small number of larvae in the dung can quickly give rise to a dangerous infestation on the pasture. On the other hand, the infective larvae do not survive long on the pasture, though in suitable conditions very small numbers may do so; and the worms do not persist in the host for very long, though again a very small number may do so.

Disease is brought about in two ways. According to the first, one group of animals which, in picking up an infection, may have become resistant, infects a pasture which is then grazed with fatal result by other susceptible calves. This danger can be avoided by not permitting one batch of calves to graze where another has grazed, or by turning out all the year's calves together and at the same time.

Alternatively, disease can be caused when calves become so lightly infected that they acquire negligible resistance but are yet a source of pasture contamination. These calves, chancing to find suitable conditions, quickly produce a heavy herbage infestation to which their low resistance is not adequate. This hazard poses a much more difficult problem, for it is scarcely practicable so to keep calves for the entire season that they cannot reinfect themselves via the pasture.

There are, however, two possible solutions. The calves can be given a measure of resistance initially by means of the oral vaccine which is now available. Alternatively, if the calves are to be fattened quickly so that they need never graze with older stock, or if local conditions are such that grazing susceptible yearlings with older stock does not appear to be dangerous, then they can be reared lungworm-free on clean ground, stringent precautions being taken to exclude infection.

Bowel worms

Yet another problem is presented by *Ostertagia* and *Cooperia*, the important bowel worms of cattle. Here, though development of the free-living stages on the pasture is slow, the development of resistance is also slow and the worms persist in the calf for a long time. It seems that the relatively lengthy free-living development can be turned to advantage. By early spring the infestation on the pasture appears always to be very low and if calves are first put out to graze in April the rate at which they pick up infection will result in a worm burden too small to be harmful. The worm eggs which, as a result of this infection, are passed on to the pasture, will develop slowly and will not raise the level of infestation on the pasture until the end of July.

It is this higher herbage infestation that will be dangerous, resulting either in outbreaks of disease in late summer or else in the accumulation in the calves of vast numbers of worms which, for the time being, do not develop but can give rise to trouble in the winter and early spring.

Though further research on the point is desirable, it seems reasonable to suggest that if the calves are moved at the end of July on to clean ground, the period for which their uptake of infection can be maintained at a harmlessly low level can be greatly extended. Indeed, it is possible that this one change of pasture, accompanied perhaps by a single dose of one of the new and more effective anthelmintics, will be sufficient to protect them for the rest of the grazing season.

Gastro-enteritis

Relatively little progress has been made in the design of measures for the control of parasitic gastro-enteritis in sheep. Partly this is because the lambs must run with the ewes which are a source of infection and partly because the number of species of worms which are of importance is rather large. Moreover, there is not yet sufficient information available regarding the biology and epidemiology of each species.

Even light infections have been shown to have an adverse effect on live-weight gain, so there are circumstances, as in fat lamb production, in which it would be an economically attractive proposition to rear a batch of lambs free or almost free of worms. This may be achieved by close folding the flock over clean pasture, perhaps with the use of forwards or sideways creep grazing, the fold being moved forward frequently and never returning to ground which has been contaminated. Clean ground in this context is ideally ground which has not been grazed by sheep or cattle for two years and, in practice, one would reserve for the purpose an area of new and ungrazed leys.

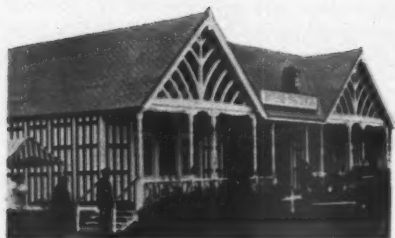
As the epidemiology of helminth infections comes to be understood better, so control may be put on a more rational basis and all control measures, be they management practices or the use of drugs and vaccines, will be fitted into well-integrated plans instead of being applied, as so often they are at present, in a blind and haphazard fashion.

'FARMING BUSINESS'

is the title of a new quarterly journal issued by the Agricultural Central Co-operative Association. Its aims are to provide news and views on the growth of agricultural and horticultural co-operative organizations at home and overseas.

Subscription: 12s. 6d. a year.

Address: Agriculture House, Knightsbridge, London, S.W.1.



The Royal

looks ahead

Christopher Dadd

FOR a century and a quarter the Royal Agricultural Society of England has striven to serve agriculture. It is usually the annual show that first comes to mind when the Royal is mentioned, but for much of its life the non-show activities have been of at least as much importance. The advisory service offered last century even included the analysis of soils and manures and the testing of seeds—for a fee, of course! The pages of the early R.A.S.E. Journals make fascinating reading. Now in its 123rd volume, the journal is still a major influence in making known the improved techniques of husbandry, and a vehicle of balanced commentaries on matters of current agricultural importance.

But the Show, as it grew bigger, took more and more time to organize, especially as it moved around the country. The development of county and then national advisory services quite naturally reduced the demand on the technical advice offered by the Society. The interest in education has remained, however, as is manifest in the organization of the National Diploma in Agriculture and the National Diploma in Dairying examinations, jointly with the Royal Highland and Agricultural Society of Scotland, and together with the Royal Association of British Dairy Farmers as regards the dairying diploma.

The Royal settles down

The time required to mount an annual peripatetic show, and especially the cost, has compelled the Society to decide upon a fixed site. The previous occasion when the Royal settled for a few years was a failure—that was at Park Royal, near London. But this was over sixty years ago, when transport over long distances was hard work and too difficult.

Today the site, at Stoneleigh, in Warwickshire, is as near the centre of England as makes little difference; and communications with most parts of the country are good. The new motorways in course of building will soon make it possible to drive quickly and with little effort from most parts of England to this new venue.

A permanent home

The cost of moving a show around is high in labour charges, but a permanent site demands high capital investment if it is to provide the facilities needed today. This cannot be done all at once, but the aim is clear.

It is the intention at Stoneleigh Abbey to provide facilities for an Agricultural Centre, the annual show being but one of the many activities eventually being carried out.

One of the opportunities which a permanent showground offers is to mount demonstrations on a scale impossible otherwise. Field demonstrations are never easy to put on, and those concerned with buildings are almost impossible to do elsewhere if they are to be really comprehensive.

A very fair start has been made with farm buildings, and it is planned to develop this considerably. Jointly with the Farm Buildings Association, a Farm Buildings Centre is being established at Stoneleigh. Work started in January with Mr. Peter Broad, an acknowledged expert, in charge. Not only will this unit guide the buildings demonstration, but it will provide an information point for all to use. It is hoped that it will also act in the sense of a catalyst in the development of farm buildings.

The show demonstrations will, it is intended, illustrate current developments without implying that this or that is the best, or indeed that the subject of the demonstration is suitable for everyone. A fair summary of our purpose is: Come and see and decide for yourself, or at least discuss the idea.

In this aerial view of the showground at Stoneleigh the Grand Ring can be seen in the centre, with the smaller Collecting Ring beyond it. To the left of the Grand Ring is the Showyard, devoted to agricultural machinery, and to the right the Stewards Pavilion and the black-and-white Royal Pavilion, shown in the heading of this article





Stoneleigh Abbey, the home of Lord Leigh

Machinery

The Royal Show exhibitors are manufacturers, not agents, and they put on the most comprehensive display of machinery that can be seen anywhere. Along the rows of gleaming equipment can be found all the latest designs and amongst them the Silver Medal Award winners. These awards are given to new machines of especial interest and merit which incorporate new ideas or serve new purposes.

It has often been said that it is difficult to find out what is new in such a large exhibition area without a personal effort. There is truth in this. It would be nice, people say, to see all the *new* equipment together in one compound. But this presents problems to the manufacturers, especially those of staffing. The possibility is, however, being looked at, and it is hoped that in due course visitors will more easily and quickly be able to get the information they want.

Livestock

Historically, the livestock section has been the core of the show. For very many it still is. There are some who say that the days of the purely inspection classes are drawing to a close. This is surely an over-simplification. Performance/inspection classes are recognized by many as having a special value, but they are not quite so easy for the ring-side visitor to follow since he does not know the performance figures until the last moment.

Some of the finer show-ring points can perhaps be classed as fancy, but many of them have real meaning in commercial terms. Inspection on conformation should surely remain, provided the particular aspects of it on which judging is carried out can be justified in commercial terms.

It is the Society's policy to serve the pedigree breeder in the stockyard and show-ring, and to illustrate the purely commercial aspects of livestock husbandry in the demonstration area. A fair objective would be to make performance and pedigree almost synonymous!

Beef sire testing

Amongst our new ventures is the Beef Bull Performance Testing Unit, which started work on 15th August last. Pioneering work in this field has been done at the Rosemaund E.H.F., the North of Scotland College of

Agriculture and by B.O.C.M. at Barlby. This R.A.S.E. unit can handle up to 64 bulls and is the first purely commercial unit offering a service to beef breeders.

This first year it is only half full, due partly to the natural reaction of many breeders to sit back and see what happens. The costs of operating the unit are relatively high and at £100 per bull there will be a loss on the first year's working. If the unit fills for the 1964-65 season, it should just be possible to make ends meet and continue, indeed develop, this service. If this first phase is adequately supported, it may be possible to provide a beef progeny testing service in due course, assuming sufficient demand.

Other demonstrations

The use of the facilities at Stoneleigh will be available to almost any organization for demonstrations and allied events out of the show season. The National Grassland Demonstration, sponsored by the Shell Chemical Co. Ltd., will be staged on 27th-28th May, using some 200 acres of land and a part of the showground. This will be our first major out-of-season activity.

Facilities will also exist for shows, demonstrations and sales by Breed Societies. Eventually, it is hoped to build a special unit for this purpose. In the meantime, adaptations can be made to existing buildings for this purpose. A sale of some 80 pedigree Hereford cattle was held on 6th November in buildings in the Demonstration area, when there was a good demand for polled females.

Long-term plan

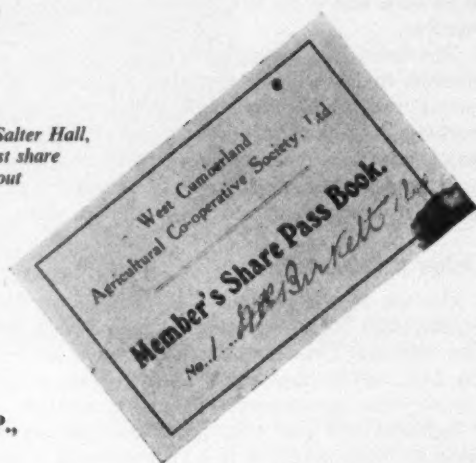
It is generally known that the Society has an arrangement with Lord Leigh, the landlord, to hold five shows at Stoneleigh, but the Society has an option for a 99-year lease. This option has to be taken up or declined by Christmas, 1964. Clearly, this will be a momentous decision, and long-term plans cannot be started until this decision is taken.

If and when the long lease is signed, we hope for improvements and developments every year until the Agricultural Centre really justifies this name. It can then be permanently and fully staffed and be available for continuous use for a wide range of activities.

Christopher Dadd, M.A., Dip.Agric.(Cantab.), became Secretary and Technical Director of the Royal Agricultural Society of England at the beginning of 1963. He was previously Regional Crop Husbandry Adviser for the Eastern region of the National Agricultural Advisory Service, and was particularly interested in potato husbandry and storage, chemical weed control, and the use of aircraft in agriculture. Mr. Dadd has travelled extensively in Britain and on the Continent, lecturing and gathering information on farming conditions. He was formerly the British representative on the Council of the International Agricultural Aviation Centre at The Hague and a member of the British Weed Control Council.

MARKETING TODAY

Mr. TOM BIRKETT, Salter Hall, Frizington, holds the first share book, which was taken out by his parents



J. C. Wade, O.B.E., J.P.,

General Manager and Secretary of the
West Cumberland Farmers Trading Society, Ltd.,
has a few things to say about

Co-operation in Practice

SUDDENLY the word 'co-operation' has assumed a respectability in the farming vocabulary which it never quite gained when the emphasis was on bulk buying. There are many who glibly talk of 'co-operation' as the answer to our marketing problems, thinking that this is a simple solution. But although I am convinced that co-operation can play a major part in solving many of our marketing problems, there is no *simple* solution.

My own Society has taken limited pioneering steps in co-operative marketing, not merely because the directors or management considered it desirable, but because of a real demand for such services from our members.

All kinds of groups

Our pig schemes developed out of a request from certain members wanting regular supplies of weaner pigs to a specification and at an economical price. We found a ready response from other members, many of them operating farms where a modest weaner production unit was a valuable extra enterprise. We are now moving around a thousand weaners a week. A parallel development in calves was an obvious step, with barley feeders in our arable

areas ready to take considerable regular quantities of bull calves, collected and reared to a specification.

So far we have done little more than tackle the mechanics of these schemes, but we have recently engaged a Livestock Officer and we have plans in hand to develop them in quality, quantity and management. In cereals we were well placed to offer group marketing arrangements. Marketing on a contract basis has been developed, and the results have pleased both our members and our customers. Similarly, we have been able to experiment with potatoes. We are particularly interested in the possibility of encouraging centralized dressing and grading for both the seed and ware trade.

In poultry and eggs we have been relatively deeply involved for many years with our own processing and packing stations and our distributive organizations at strategic points.

We see a considerable future for modest production groups, believing that the days of the individual farmer sitting in his own kitchen or office and making plans to feed this or grow that are passing. All too often thousands of them take the same decision on the same night and so start the production cycles which bedevil all planned marketing.

Gathering pace

Several of the production groups working with my Society are little more, as an entity, than discussion groups; one specializes in potatoes, another in grain, another in pigs. Some collective decisions are taken (and in future more will have to be taken), but already we see signs of a keener interest in sharing information, sharing experience and coming to collective decisions.

Our own early experience in egg packing, and later in broilers, triggered off our interest in production groups as an answer to our own marketing problems. We found it so much easier to sell agricultural produce than to procure it—and we still do. Our own sales of eggs have for many years been at twice the level of supplies; we have to buy the rest from other packers.



Dairy calves are collected from breeders for transport to rearers

We have been very much aware of the implications of the revolution in retailing since several years ago when we received an inquiry for 1,200 cases of eggs per week and we had to ask for time to organize supplies.

Today we serve some 18,000 farmers, small and large, a cross-section of the farming community, and our sales during 1963 exceeded £18 million. Eleven Directors, appointed by the members, lay down policies and they have passed to the Society's General Manager the responsibility for providing requirement and marketing services over a wide range of activities. As the Society has grown it has been necessary to build up an organization structure which can provide good communications over a wide area, with specialists available for all major activities.

Co-operation can take many forms and we claim no particular merits for our own type of organization, beyond suggesting that it appears to work. An established agricultural trading society presents to the farming community in its area an existing organization with good lines of communication and ready-made administrative facilities. In this way I do think we have something special to offer, and if we don't cash in on these advantages it will be because of our own inefficiency.

The W.C.F. goes back to 1911, when a small group of farmers in Whitehaven, Cumberland, decided to form a group buying organization. They were anxious to improve the quality of the feedingstuffs they required and to obtain the financial advantage of bulk purchase.

The objects of the Society are primarily to supply members with their agricultural requirements, to market members' produce at an economic price, and to make an annual distribution of profits in proportion to the trade members do with the Society.



Weaner collection lorry leaving a pig breeder's farm near Wasdale in the Lake District



BARLEY

W. M. David puts

The Maltsters' Point of View

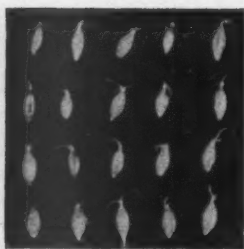
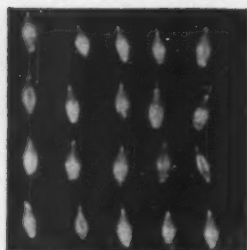
It has often been said that barleys are like women: we all love them but we do not all agree as to their qualities. This is just as well, because if we did those of us who use barley would all be demanding the same type—an impossible situation. As beauty is in the eye of the beholder, let us try to consider only those qualities of barley which are obvious or which can be determined by analytical or other tests.

But first, a thumb-nail sketch of the malting process. Those readers who are familiar with the process can therefore skip the next paragraph.

Malting process

The maltster dries and screens his barley as soon as he can after intake, and, if possible, he stores it for at least six weeks to enable it to recover from dormancy. He then steeps it in water for anything up to 65 hours and, after draining, spreads it on the malting floor where it germinates and begins pushing out roots. During this stage, lasting around nine days, various enzymes are activated. Their main job is to convert the starch in the corn from an insoluble to a soluble state, as is required by the brewer or distiller for his process. This, of course, is exactly what happens when the corn is sown in the ground and enables the plant to survive on the soluble starch until the roots grow enough to find their food from the soil. The maltster is harnessing this natural plant growth for his own purpose.

When, in the judgment of the maltster, this conversion is complete, he moves the germinated barley to his kiln, there to dry as quickly as possible,



GOOD MALTING GROWTH

Left Two days after draining

Right After 5 days on malting floor



Left After 8 days on malting floor

Right After 9 days and just before moving to kiln

and then heats or 'cures' it, to give, among other things, a malty flavour. Finally, he screens it again to remove the dried rootlets, and is left with malt which he stores as if it were grain. Then he does his best to sell it.

Germination

It is obvious, therefore, that unless barley will germinate, it is of no use to the maltster—whatever its other attributes may be. This is a matter of plain fact, but one difficulty has always been that poor germination is virtually impossible to detect on hand inspection, except of course in the case of obviously heated corn. The alternative was to grow a sample on wet sand or blotting paper, but this meant a delay of several days. Fortunately, science has taken a hand and there are now available several variations of a quick method of testing for germination, using a chemical which stains the germs of the corn in such a way that the dead ones can easily be distinguished from those alive.

The causes of poor germination can be narrowed down to incorrect storage at a too high moisture content and where there are no drying facilities, and artificial drying with too little air and/or too much heat. The latter can easily be eliminated by proper operation of the drier, but the former is more difficult.

Incorrect storage has a larger responsibility for germination damage than any other cause, and as a maltster I say let us dry and store the barley. It is part of our process and, since it is also the beginning, it is something over which we take the greatest care. I know it will be said that maltsters cannot always deal with barley when it is available, and that there are cash incentives to farmers to keep their barley off the market in times of glut, but it is also true that these can sometimes be more than cancelled out if the barley goes wrong through wrong storage. There is no simple answer to all this but I do believe that more care could be taken in drying and that better arrangements could be made for storage of undried grain on the farm.

Nitrogen content

Its content of nitrogen is a very important quality of malting barley and, so far as I know, there is no way of controlling it, either on the farm or in the malting process. But the fact remains that brewers and maltsters, to an ever-increasing extent, demand specific nitrogen contents. Many are now analysing both their purchases and their deliveries. Here again, it used to be possible to estimate nitrogen on hand inspection with a fair degree of accuracy, but nowadays, because one supposes of new varieties, modern fertilizer practice and harvesting methods, the old yardsticks no longer apply. One has to rely on the laboratory.

Apart from the fact that the brewer is much more particular about the nitrogen contents of the malts he uses, the general level of nitrogen seems to have shown a gradual rise, due presumably to the greater use of nitrogenous fertilizers to step up yields. Much has been said and written about this subject, and I can add nothing to it, but perhaps one day the grower *will* be able to control this factor and so be in a position to offer barley at any nitrogen level at an appropriate price.

Screening

I have often thought that growers might be able to show much superior samples of barley if they screened more severely at the time of combining or threshing. It is surprising what a tremendous improvement in appearance there can be after the removal of two-thirds per cent by weight of thin corns. These are not loss; they are still barley and of feeding value.

Varieties

The average maltster would dearly love to put the clock back to the days of the traditional malting barley varieties such as Spratt and Plumage Archer, but like many others he has learnt to live with progress and to benefit by it. He has had to face the fact that traditional malting barley qualities and high yields are generally incompatible. He has therefore looked for help, in company with farmers, to the plant breeders. And not in vain, as witness the outstanding success of Proctor. This variety is still the mainstay of both growers and maltsters, but there are signs that it may be displaced by other varieties, better able both to meet the demands of yield per acre and to withstand the vagaries of our weather.

The co-operation between breeders, growers, brewers and maltsters is so close that I feel confident that further new developments are bound to be of benefit to all sides.

Much of what I have said is just giving rein to my thoughts, and I have tried not to be too categorical. I know full well that no matter how much a grower may have laboured to produce a fine malting sample of barley, he may wake up one morning to find his crop as flat as a pancake. And in these circumstances he will probably think first of salvage and only lastly of malting quality!

The author, **W. M. David**, is Director of Associated British Maltsters (Northern), Ltd. In 1942 he qualified at the Oxford University Institute of Agricultural Engineering as an instructor in tractor ploughing and other cultivations. When the Institute became the National Institute of Agricultural Engineering and moved to Askham Bryan, near York, he became its Administrative Secretary before joining Associated British Maltsters in 1944.



The Danish Glasshouse Industry

P. G. Allen

and

D. J. Fuller

Danish glasshouse production came into prominence in the early 1930s, many of the first nurseries being founded by men who had gained their experience in England by working in the Lea Valley or the Worthing district. By 1960 the glasshouse area was estimated at 1,120 acres; the acreage is now well over that figure.

MOST of Denmark's glasshouses are either around Copenhagen on the island of Zealand or around Odense, on the island of Funen, plus a small development along the east coast of Jutland. These areas are between latitudes 55 and 56°N, which means that they are much further north than our own main centres of glasshouse production and about level with the Clyde Valley. Winter day-length is thus relatively short but the light intensity is good, and early tomatoes or cucumbers are grown on many nurseries.

The bulk of the produce is sold within the country. Pot plants, carnation cuttings and *Asparagus plumosus* fern are, however, exported regularly. Most nurseries are now engaged on a programme of expansion with the emphasis on labour-saving devices and factory methods of production. Construction costs are at least as high as in this country, but in recent years it has been possible to borrow 60-70 per cent of the required capital at commercial rates of interest from credit institutions set up to aid farm production.

Design and equipment

The Danish Growers' Association is behind much of the progress. In conjunction with its Technical Advisory Service it has prepared glasshouse designs with standard specifications which are used by most of the manufacturers. These standard designs are for houses 8, 12 and 20 metres wide (27, 40 and 66 feet) and completely free from purlin posts or other obstructions.

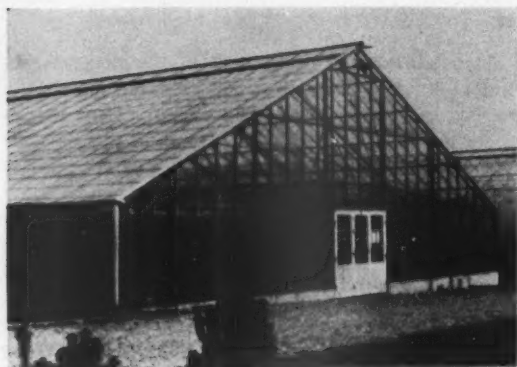
The 12-metre-wide houses are the most common. They are of relatively simple design: a main framework of rolled steel joist sections with a simple tie bar or plate across the apex of the ridge. A specially designed tubular roof truss is used to support the great weight of glass in the 20-metre-wide houses. The roof trusses are delivered on site in prefabricated sections, ready for bolting to the joist uprights, which are spaced at 12-ft intervals along the sides of the house. Full-sized tractors are sometimes used for cultivations in these clear spans, and houses are being built up to 360 ft in length to economize on construction costs and to make the best use of cultivation machinery.

Most of the roof trusses are of either painted or galvanized steelwork, but the glazing bars are of wood. Glass sizes have been steadily increasing; sheets 90 cm wide and 70 cm deep are now used in the standard designs. Sheets 90 cm square (36 inches) have been used but the rate of breakage was too great in high winds. The smaller size gives extra strength from the increased number of laps, without obstructing the light by increasing the number of glazing bars.

Automatic ventilation is general, operated either by an electric motor acting on cables or torque rods attached to the conventional ventilation gear, or by a pneumatic system actuating several rams from one air compressor. Some of the large pot chrysanthemum nurseries are equipped to apply the blackout material automatically by means of a time clock governing an electric motor. This draws the screen right across the house at eaves level on a system of plastic pulleys running on permanently fixed wires. A similar system, operated by a solarstat in the roof of the house, is used to apply muslin shading material on pot plant nurseries growing crops such as St. Paulias.

Possession of first-class heating equipment is a matter of great pride, and most boiler houses are maintained spotlessly clean. Large round chimneys of a standard design are a characteristic feature of the glasshouse areas, and most of the boilers have now been converted to oil-firing. Many nurseries are equipped with rotary cup-type burners and oil in the range 900-1,500° Redwood is being burnt; there is no price advantage at present in using the heavier grades. High speed hot water systems with small-bore pipes are the most common, although some people are using a pressurized system to get greater heat transmission by virtue of the fact that the water can be circulated at temperatures above boiling point.

New nurseries are being built with a series of irrigation mains running alongside the heating mains, so that all watering and liquid feeding can be controlled from a central point. Hose watering is still practised but most nurseries now have some form of irrigation system, ranging from simple overhead lines to sophisticated trickle systems. A system of fine plastic tubes in place of the familiar drip nozzles is coming in to vogue for tomatoes, cucumbers and asparagus fern, while carnations are watered by a system of



Gable-end view of a 20-metre-wide modern Danish clear-span glasshouse. These houses often of great length, are of individual construction and are orientated E—W to obtain maximum winter light

plastic spray nozzles fitted into rigid plastic pipes running along both sides of the beds at soil level.

Cordon cucumbers

Cucumbers are one of the most important crops and almost all are cordon grown in large, airy houses. The system is similar to that practised in Holland, but the plants are given more space; about 4,000 per acre. Main stems are stopped at 5–6 ft and all the first laterals are stopped at the first leaf, although most growers then allow the sub-laterals to grow to a greater length to keep an adequate leaf area. The fruits are cut at an immature stage by English standards, especially early in the year, but yields of 120–160 tons per acre are claimed.

Horse manure is scarce in Denmark, and the beds are made of barley straw or a mixture of barley straw and peat. High nitrogen levels are necessary to keep breaks growing from the base of the laterals, and no shading is given. Plants grow exceedingly well in the large 66-ft-span houses, where each has 145 cu. ft of air, compared with 40 cu. ft in the old type houses. Because of the simple system of training, labour needs can be as low as 1½–2½ men per acre where the produce is sent in open boxes for packing at a co-operative market.

The most popular variety is Bestseller, an F1 hybrid similar to BDR, and plants are set out as early as mid-January to crop through until October. Almost half the cucumber plants in the country are raised in special propagation nurseries, rather than on the holdings where they are to be cropped.

Mid-April tomatoes

Tomatoes are sown in early to mid-November and are in pick from mid-April onwards. Many growers are familiar with the results of recent English experiments, and the cultural system is a combination of Guernsey methods and the techniques for early production advocated by the Lee Valley Experimental Horticulture Station.

The main variety is Revermun, an F1 hybrid produced by a keen Danish amateur, Mr. F. Lindgreen, and because of its vigorous habit it is usual to use as few as 8,000 plants per acre. Cladosporium resistance is one of the features of this variety, but the fruit is rather larger than is required for the

English market. Potentate is also grown, but this is set out at a density of 14,000 per acre. Liquid feeding of the crop is practised but although growers make use of regular soil analysis throughout the season, they do not appear to have the same control over the plants as the majority of the specialist growers in Britain.

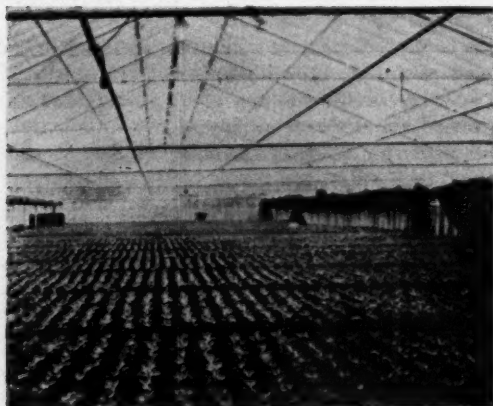
Asparagus plumosus

Asparagus plumosus fern is an important crop, particularly on Funen Island, where it is claimed that the costs of production are approximately equal to those for cucumbers; but the returns are 10-12 per cent higher. Western Germany is the main market for this crop. Its superior quality and light colour command a higher price there than the outdoor-grown Italian produce. The crop is cut over every seven to ten days, and beds are usually left down for three years or until such time as the crop falls below 6 tons per acre a year.

Pot plants and flowers

Pot and house plants are produced in large quantities for the home and export market, and at least one large firm has developed a year-round export trade to countries as far apart as Finland in the north and Italy in the south. House plants have been extremely popular in Scandinavia for many years, but the trade for pot chrysanthemums is developing rapidly. The Danish growers have departed from the standard 5-inch pot in favour of a cheaper product with 1-3 well-budded plants in 3½-4½-inch pots. St. Paulias are also a feature of many pot plant nurseries; one specialist grower at Stige on Funen Island produces over half a million a year.

Specialization has been developed to a very high degree for the propagation of both carnation and chrysanthemum plants. There are at least two large organizations where meristem culture of carnations is practised for the production of disease-free mother stock plants. Carnations for cut flowers account for a substantial part of the flower acreage, although gerberas and roses are also widely grown. The roses are now being propagated by bench grafting under mist, and the grafted plants are being put out into their permanent quarters three weeks after grafting.



Interior view of a 20-metre-wide house of pot chrysanthemums, showing the automatic blackout

Marketing

On Funen the marketing of the produce is largely through the co-operative market at Odense, which has over 1,100 grower-members. This large market operates a clock auction for the selling of most crops, with the produce passing from the assembly halls on wheeled trolleys which then go before the clock on a moving floor.

The *Asparagus plumosus* fern is not auctioned, but almost all of it is graded and packed in a special hall attached to the auction and is then exported to Germany.

There is no corresponding auction on the island of Zealand for growers in the Copenhagen area. Most of them sell their own produce in the city market. But the leading growers are aware of the advantages of the organized market at Odense and a move is afoot to start a co-operative scheme in 1964 for the marketing of tomatoes and cucumbers.

Benefit from research

Research work on glasshouse crops is carried out at the Royal Danish Agricultural and Veterinary College in Copenhagen and at the Glasshouse Research Station at Virum on the outskirts of the city. In comparison with us, research facilities are therefore limited, but the work is supplemented by a large number of experiments carried out by advisory officers on commercial holdings; and growers are also making full use of work done in other countries. The Advisory Service is controlled by the Growers' Association, with a major part of the cost being borne by the Government. A high proportion of the advisers work solely on glasshouse crops and there are three national specialists, one for mushrooms, one for carnations and one for *Asparagus plumosus*.

Three horticultural schools are also run by the Growers' Association, one-half of the cost being paid by the Government and part of the remainder coming from the fees paid by the growers for the soil analysis service. Students are given a thorough classroom training after having spent at least three years in commercial horticulture and having worked on at least two different nurseries.

Prospects

The whole picture is that of a well-organized industry carrying out a programme of expansion and re-equipment, with an available source of capital and a co-ordinated scheme for the training of its young workers. Some growers are a little worried about the possibility of over-production, but modernization has undoubtedly put many of the Danish nurseries on a par with the best in Europe, and they will be in a strong position to meet any competition within the next ten to twenty years.

THE AUTHORS: P. G. Allen, N.D.H.(Hons.), and D. J. Fuller, B.Sc., N.D.H., who are both in the N.A.A.S., visited Denmark and the Hamburg area of West Germany in the spring of 1963. After a period as Advisory Officer in S. W. Devon, Mr. Allen moved to the Lee Valley Experimental Horticulture Station in 1958, and in the autumn of last year he was appointed Director of the Station. Mr. Fuller is County Horticultural Advisory Officer for Cheshire. He previously served as an Advisory Officer in East Cornwall, where his duties included the supervision of the Ellbridge Experimental Horticulture Sub-Station.

THREE FARMS INTO ONE

Visualizes more efficient farming on less capital

Farm Amalgamation

The Cadlands Story

Ralph Whitlock

MACHINERY syndicates and farm amalgamations are already emphasizing the need for considerable thought about the structural reform of land management which seems to be inevitable within the next quarter century. To strengthen their economic status, farmers are beginning to co-operate with their neighbours more closely than they have ever done before. The effect of the syndicates is to create for a limited purpose, such as the use of a particular piece of machinery, a new and larger unit than any of the constituent farms. Exactly the same end is achieved, though more thoroughly and permanently, by actual amalgamation of farms.

The process of amalgamation can be expected to be slow, implying agreement between two farmers, and that one of them is willing to relinquish his former independence. Usually this happens only when a farmer decides to retire.

Mr. Drummond's inheritance

Young Mr. M. A. C. Drummond, who has recently taken over his inheritance of the Cadlands Estate, near Fawley, Hampshire, is therefore lucky in being able to implement a three-farm amalgamation. Mr. Drummond's difficulties were aggravated by the fact that he has a truncated, or rather a decapitated, estate. The huge Esso oil refinery, established after the war by Southampton Water, took over the heart of the Cadlands Estate, including the house, park, estate office, home farm and in all about 1,500 acres of the best land. Thereafter death, estate duties and an interregnum combined to prevent any imaginative schemes for recovery.

When Mr. Drummond came down from the Royal Agricultural College at Cirencester to take over the reins in 1956, he found that, of the remaining 2,500 acres of the estate, only one farm, of 316 acres, was in hand. This, Stone Farm, had been treated as the home farm, though on a makeshift basis. The property included shops, garages, a village hall and sundry other appurtenances, including 70 cottages, of which only ten were occupied by tenants getting their living from the estate.

Three into one

Having shed as many of the liabilities as possible and introduced a few modest improvements to Stone Farm, Mr. Drummond and his new resident agent, Mr. R. Bacon, last year (1963) experienced a helpful break. It came in the request of a tenant who, because of ill-health, asked that his son, Mr. Stephen Wright, should be associated with him in the tenancy. The estate put forward as an alternative proposal that the tenant's farm, Stanswood, should be amalgamated with Stone Farm, under the management of young Mr. Wright. This having been agreed, yet a third farm, Badminton, came into hand through the retirement of its tenant. So Mr. Drummond now had three farms, one of 316 acres, one of 237 and one of 185, ready to weld into a single unit of 738 acres.

Between them the three farms had been supporting 163 milking cows and 130 young stock. The greater part of the acreage was in grass, but 217 acres of grain and nine of potatoes were grown. Seventeen men, including the farmers and their sons, made a living from the farms at a total annual labour cost of £8,061. Machinery investment amounted to £9,356, with annual running costs of £5,447. The average basic costs per acre were about £20.

Husbandry aspect

Mr. Peter Jones, the County Advisory Officer for Hants, whose help was sought, suggested concentrating the entire dairy herd at Stone Farm, with 120 milking cows as a probable optimum. He calculated that these would need about 340 acres of grass and forage crops (a stocking rate of 1.8 acres per cow equivalent), which would allow the corn acreage to be increased from 217 to just short of 400.

The second farm, Stanswood, would be developed as the arable centre, with the installation of a grain drier capable of dealing with 3-4 tons an hour, at an approximate cost of £2,000. Other arable equipment, including a large combine harvester, four tractors, three cultivators, four ploughs, two drills and sundry other implements, plus a mill-and-mixer in the barn and tools for making hay and silage, would total about £10,000 at new price, though, seeing that the purchases would be spread over a number of years, a two-thirds price of about £6,700 was more reasonable.

The total machinery investment, putting the drier at £2,000, would thus be £8,700, a reduction of nearly £1,000 on the present figure. Running costs would be reduced by an even greater margin, to £4,200 a year. The total net output of the amalgamated farms would, at £23,400 a year, represent a net output of £557 per £100 machinery costs. On the previous individual farms it ranged from £302 to £542 per £100 machinery costs.

A similar economy would be effected in labour. The dairy at Stone Farm would need two cowmen. The arable enterprise would require three tractor-drivers. In addition there would be two general farm-workers, one of them

able to act as relief milker. One manager would supervise the whole. The total labour force would thus be eight men instead of the previous seventeen, and the year's labour bill would be cut from £8,061 to £5,400. The previous gross output per £100 labour costs ranged from £366 (on Badminton) to £418 (on Stanswood). It would now be £526.

Buildings aspect

On all counts, therefore, this amalgamation seems well worth while. The most controversial point is how much ought to be invested in new buildings. Mr. R. G. A. Lofthouse, the Regional Land Commissioner, is of the opinion that the basic estate management decision must be made to treat the three amalgamated farms as a permanent single unit, not as a temporary merger which could be split up again at some future date. On this assumption, it immediately becomes clear that it would not normally need more than one centre. But he accepts the agent's case for two if the dairy is to be concentrated in one place and the corn in another. He suggests that the dilapidated set of buildings at Badminton should ultimately be eradicated with a bulldozer.

The difficulty is that while both Stone and Stanswood have fairly good sets of buildings for their original set of fields, neither has buildings adequate for the new farm. To establish a 120-cow dairy at Stone, would mean demolishing the present useful range of calf pens and ignoring a good, modern concrete-and-asbestos structure for 60 cows, too awkwardly sited to be enlarged. This would mean replacing them with a larger one at a cost of perhaps £12-13,000. Faced with this expenditure, the estate may decide to run two separate herds, one at each farm, a solution which could have other advantages. The possibility must also be borne in mind, in planning such amalgamations, that within a few years more land may fall in hand, requiring further adjustment in the size and location of buildings.

The fact that during the past decade in England and Wales farms of over 300 acres have increased in number by about 1,200, while for farms of other sizes there has been a decrease of about 29,000, provides a measure of the rate of amalgamation. The Cadlands exercise shows that not only can the larger acreages be run more efficiently, but that the capital investment needed is actually smaller, unless large re-building schemes are inescapable.

Report of the Verdon-Smith Committee of INQUIRY into FATSTOCK and CARCASE MEAT MARKETING and DISTRIBUTION.

This 300-page report (Cmnd. 2282) was published by H.M. Stationery Office on February 20th, price 18s., from any bookseller.



When all the costings have been done and the gross and net margins worked out, it is the farmer himself who puts the figures in the £ s. d. columns of his accounts book

Jack Tasker

Beyond the Balance Sheet

WITH so much being written and said about farm business analysis nowadays, it is only prudent to get it into its right perspective. It has a vital part to play, but it must not be allowed to mask other important facets of the farming structure. The system is not all-embracing, nor is it the solution to all a farmer's problems. A type of analysis has been evolved which can be applied to most farms, but the results must be interpreted in relation to the individual farm and the individual farmer. Every farm has its special peculiarities and every farmer has his.

Economics is of paramount importance, but it is not the be-all and end-all. There are a number of headings which do not appear in any farm analysis system. Amongst these are traditionalism, apathy, tardiness, lack of foresight and natural leanings, none of which show up as £ s. d. on a balance sheet, and all of them can materially affect it. And they are all more difficult to put right than low gross margins or returns per £100 of capital.

Tradition dies hard

Too many farmers today are still steeped in tradition, either inherited or the result of local practices. Neither is sound reasoning. Farming methods

have made enormous strides in the past two decades, yet a good many farmers are still working on pre-war uneconomic systems. Take the traditional beef men, for instance—the 2½–3 year old bullock feeders. An analysis of this system shows that the returns from it come bottom of the beef production table. This is not generally realized, but even when it is, the practice sometimes continues, merely because the farmer likes to look over the fold-yard rails on a Sunday morning and see a nice bunch of cattle. Perhaps some can afford to pander to this foible, but there are many who cannot.

Then there are the farmers who don't believe in using nitrogen—the lime and basic slag addicts—though they are starting to use compound fertilizers without realizing that most of them contain nitrogen. It robs the land, they say. The same men will buy modern cereal varieties and sow good grass mixtures but will not give them a chance to produce the yields of which they are capable. And yet the adequate use of manures is one of the best ways of increasing the gross margin per acre of crops and grass.

It is still common to find men who wouldn't dream of sowing or turning stock out before the traditional date—and this adamant attitude despite the fact that the seasons vary enormously. Even though soil conditions are ideal or there is a good crop of grass, it doesn't make the slightest difference; the appointed day has not arrived. Must be something to do with witchcraft!

And what about the dairy farmers who feed expensive concentrates to cows grazing rich spring grass capable of giving maintenance plus 4–5 gallons? They've always done it; they like to give them a bite to come into at milking time. Point out to them that they are missing an opportunity to make some cheap milk to offset the dearer winter milk, and they will still do it.

There is no column for attendance at markets on the analysis sheet, but is there anything more traditional than this? Two or more markets a week attended and an occasional farm sale thrown in for good measure! Very often they neither buy nor sell, but they must be there. Is it the fascination of watching the auctioneers or merely for social purposes? Wouldn't this time be better used at home?

You may be thinking that the apathetic farmer will not be interested enough to have his farm business analysed. It is a logical thought but not always true. There are several forms of apathy. The man who asks for an analysis to be done hoping, nay expecting, that the results will give him a pat on the back for doing so well is a case in point. Fair enough, he may be making an average living, but if he is shown that he could improve it, he is not interested. That's apathy in reverse. It's the same type who looks over a neighbour's fence to find that he is obviously doing better than himself. He will turn away convinced that the neighbour is either robbing his farm or heading for thrombosis.

A form of apathy has manifested itself amongst participants in the Small Farmer Scheme. Comparing two very similar farms in the same locality with like amounts of grant attracted by the agreed plan, what happens? One of them sees his opportunity, grasps it with both hands and makes the most of it. The other merely regards it as manna from heaven and carries out the plan literally but neglects the fields or enterprises not encompassed by it. The result is that the former is on his feet and away whilst the latter is wondering what will happen when his grants finish. Then back into hibernation!

Missing the boat

Under the heading tardiness, the farmers who come to mind are those who are always late in everything they do. Late with cultivations, late with sowing, late with harvest. There is very often no need for it, and it applies in particular to the smaller man on the one-man farm who can least afford to be behindhand. He will probably find some reason to be away from the farm on a day when the land is just right for sowing or a crop ready for gathering and next day it will rain and so may put him back a week or more. The same thing happens every year. But this is not the only way of missing the boat. What about the fellow who starts to fettle his reaper or binder or combine the day he wants to use it? Frequently he finds some repair is needed which might even involve getting a new part. Many an acre of corn has been left to get over-ripe, and many an acre of meadow become too mature through this sort of thing. But he never changes. He is no worse, though, than the man who leaves expensive machinery just where it finished working and forgets about it until he next needs it or it is interfering with the cultivation of the field in which it lies. But then you can always plough round it—some do!

Lack of foresight shows up in various ways. Take the use of lime for instance. Every year acres of barley fail through soil acidity. This crop is first to give warning that the land is becoming depleted of calcium. Many crops showing deficiency symptoms can be saved if taken in time, but often it is too late. With all the technical advice available to farmers in this day and age, there is no need for this sort of thing to happen. They will say that they sowed good seed in good soil conditions with adequate fertilizers in the seedbed but liming never entered their heads. However good all other factors are they go for nought if land is lime-hungry when susceptible crops are being sown.

Another fairly common form of poor foresight is for a farmer to have a portion of his land which doesn't crop well no matter what is sown. This has possibly gone on for years, but he makes no effort to find a reason for it—probably because local people have told him that it never grew anything and never will. But the same people can offer no good explanation. Meanwhile, the occupier is paying rent for it, has lost income from it and allowed the cause to get a firmer hold.

Uncommon denominator

Every farmer has a natural leaning to a particular type of farming or a particular class of livestock. This fires him with a desire to know more about it and endows him with an ability to do it well. If he is interested he is half-way to success. All things being equal, it indicates the line he should take. Obviously, if one of his interests and skills is more lucrative than another he should choose the former. But it may be a mistake to take up a line which shows a better return if he doesn't like that particular enterprise. If he has no knowledge of sheep, for instance, and hates the things he would be better trying to improve something he does like, even though the returns from sheep look more attractive on paper. This may appear to be obvious, but it is so often overlooked that it is worth emphasizing.

What is the outcome of all this? It boils down to one uncommon denominator—the farmer himself. An analysis of the farm business will show what was happening on his holding over the previous twelve months. It will pinpoint the good enterprises and expose the not-so-good. A budget will show

where and how improvements can be made with existing enterprises and indicate possible alternative enterprises which will improve the economy. The new plan can work, but it will succeed only if the farmer sets out to *make* it work. There are so many factors in farming which can mitigate against the best of plans and it is implicit on the farmer to know them all and reduce their influence so far as he is able.

The author of this article, **J. Tasker**, joined the Ministry in 1942, after 20 years' practical experience on mixed farms in Yorkshire. He was appointed to the National Agricultural Advisory Service when it was formed in 1946, and is now Senior District Advisory Officer in the Divisional Headquarters at Harrogate.

The Ministry's Publications

Since the list published in the February, 1964, issue of *Agriculture* (p. 83) the following publications have been issued.

BULLETINS

No. 135. Fruit Tree Raising (Revised) 7s. (by post 7s. 6d.)

Deals with all aspects of fruit tree raising and contains information on virus diseases and pest and disease control.

No. 143. Salad and Other Food Crops in Glasshouses (Revised) 5s. (by post 5s. 5d.)

Both the commercial producer and the amateur gardener will find this Bulletin of value. Extensively revised, it contains some interesting facts about Continental methods and how they are being adopted in this country.

No. 176. Records and Accounts for Farm Management (Revised) 6s. 6d. (by post 7s.)

Explains in a straightforward but comprehensive way how to prepare and interpret farm accounts.

ADVISORY LEAFLETS

No. 20. Blackhead (Revised)

No. 29. Chemical Composition and Quality of Milk (Revised)

No. 110. Frit Fly (Revised)

No. 397. Rearing of Turkeys (New)

No. 463. Winter Grass (Revised)

FIXED EQUIPMENT OF THE FARM LEAFLETS

No. 8. Farm Gates (Revised) 6d. (by post 9d.)

No. 14. Sheep Handling Pens and Baths (Revised) 6d. (by post 9d.)

Single copies of Advisory Leaflets, up to a maximum of six different leaflets, may be obtained free from the Ministry (Publications), Government Buildings, Tolcarne Drive, Pinner, Middlesex. Copies beyond this limit must be bought from Government Bookshops (addresses on p. 148), price 3d. each (by post 6d.). Other publications are obtainable from Government Bookshops, from Divisional Offices of the Ministry or through any bookseller.

Field Crop Sprayers

P. RICHARDSON • G. P. SHIPWAY

MANY useful spray chemicals (chiefly herbicides) which have recently, or will soon, become available are either expensive or have a comparatively small margin between the dose which will control weeds and the dose which will damage the crop. If advantage is to be taken of these spray chemicals, their application must be much more precise than is customary at the moment.

Uneven spray application may be due to any or all of the following: (1) unsuitable or faulty machinery, (2) incorrect machine setting, and (3) unskilled operation in the field.

The sprayer

The three parts of the machine which have the greatest effect on uniformity are the nozzles, the boom, and the agitation system. The set of nozzles used should have even spray patterns, and their throughputs from the highest to the lowest should not vary by more than 4 per cent for precision spraying and 20 per cent for general spraying. It is hoped that nozzles conforming to the British Standard Specification will be available shortly.

The boom should be rigid enough to prevent excessive whip, otherwise the height of the nozzles from the ground will vary sufficiently to cause unevenness in the spray application. The feed-pipe to the nozzles should be large enough in diameter to avoid any appreciable pressure drop between the middle and end nozzles on the boom.

If the chemical is to be applied evenly, then the material in the spray tank must be thoroughly mixed and must remain so throughout the application. A sign of insufficient agitation is a heavy deposit of chemical on the bottom of the tank.

The setting

The correct size of nozzle must be chosen and it must be operated at the correct pressure. All nozzles should be checked for output. A simple way to

do this is to fill the tank with water and, with the machine working, collect the output from each nozzle. Jam jars are useful for this; if a set all the same size is used, then the output from all the nozzles can be collected simultaneously. When the jars are almost full, stop spraying and compare the water levels. With high pressure nozzles particularly, it will be found an advantage to fit a small piece of tubing such as lay-flat polythene tubing over the nozzles to guide the water into the jars.

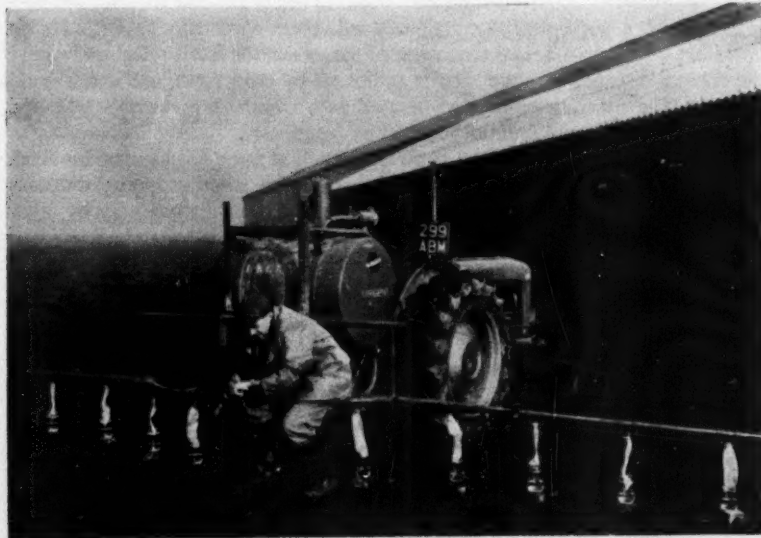
It is important to ensure that the overall application rate is correct. This can be checked by timing the filling of the jars and, after comparing individual nozzle outputs, measuring the total contents of all the jars to find the output in gallons per minute. Then the application rate can be easily obtained by the use of a pocket calculator. Further checks can be made during work by relating the number of tankfuls required to spray a known area.

For precision spraying it is best to buy sets of nozzles and to keep them in sets. If some nozzles of a set get lost or damaged it is better to obtain another complete set rather than to insert new nozzles into an old set.

The spray nozzles must be set at the correct height to give a uniform spray pattern. The instruction book should give the minimum height at which the nozzles should be set above the crop to obtain uniform application across the swath. If this information is not available the boom should be set so that the spray from the edge of one fan strikes the crop immediately under the adjacent nozzle. To allow for whip, the boom should be raised by a further amount equal to half the vertical movement which can be expected at the end.

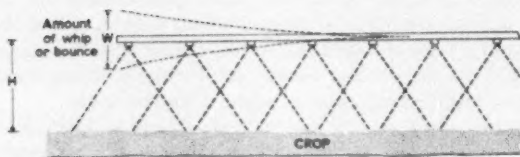
Sprayers must be operated at the right forward speed and, because speedometers are sometimes faulty, the readings should be checked. To do this, measure out a distance of 88 ft with a tape, then run the tractor over this distance and time it. If it takes one minute the speed is 1 mile/hr, if a half minute 2 miles/hr, and so on.

Check nozzles for output



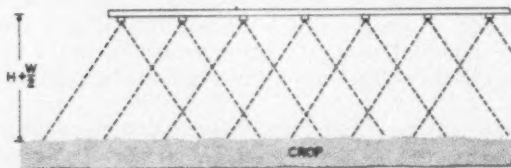


Boom too low - insufficient overlap



Boom set for correct overlap
no allowance for whip

SETTING THE BOOM



Boom correctly set

The operation

Even with a good machine correctly set, poor work can be done by an unskilled operator. Careful matching of spray swaths is essential and where the correct distances are not clearly indicated by crop rows, markers should be used. The machine must be operated at a constant forward speed and the operating pressure should be checked frequently.

The nozzles should be looked at often to see that none has become blocked. If a blockage occurs, operate the anti-drip device when stopping. Nozzles should be poked out only when it is impossible to clear the blockage by other methods, and then only a soft probe, such as a sharpened match, should be used. A wire probe will damage the nozzle. While a blockage is being cleared the material in the tank should be kept agitated. Filters should be cleaned out frequently so as not to impede the flow of spray material.

A number of machines have been tested at the N.I.A.E., and the reports should be of help to prospective buyers.



Agricultural Chemicals Approval Scheme

Additions to the 1964 List

THE following additional products have been approved under the Agricultural Chemicals Approval Scheme since the Fourth List of Approved Products for Farmers and Growers was published.

INSECTICIDES

gamma-BHC ((LINDANE))

Liquid Formulations

Mi-Dox Lindane Emulsion—Midox

BHC (TECHNICAL BHC)

Wettable Powders

Berk's 50% BHC Dispersible Powder—F. W. Berk & Co. Ltd.

DDT

Liquid Formulations

Mi-Dox 25% Miscible DDT—Midox

Wettable Powder Formulations

Berk's 50% DDT Dispersible Powder—F. W. Berk & Co. Ltd.

Mi-Dox 50% Dispersible DDT—Midox

DDT with BHC (TECHNICAL BHC)

Wettable Powder Formulations

Berk's Combined DDT/BHC Dispersible Powder—F. W. Berk & Co. Ltd.

DDT with MALATHION

Liquid Formulations

Mi-Dox DDT/Malathion Emulsion—Midox

FORMOTHION

A systemic organo-phosphorus compound for the control of aphids and red spider mites on many agricultural and horticultural crops.

Liquid Formulations

Anthio—Pan Britannica Industries Ltd.

TETRADIFON

Atomizing Solutions

Tedion V—19 Acroside Fluid—Pan Britannica Industries Ltd.

FUNGICIDES

MANCOZEB

Dusts

Chafer's Dustox 945 Fungicide—J. W. Chafer Ltd.

MANEB

Wettable Powder Formulations

Tubothane—May and Baker Ltd.

MERCURY—ORGANO-MERCURY

Foliage Sprays

Berk's 2½% PMN Dispersible Powder—F. W. Berk & Co. Ltd.

*6—METHYL—2—OXO—1, 3—DITHIOLO

(4, 5, 6) QUINOXALINE

For the control of mildew and red spider on apples.

Wettable Powder Formulations

Morestan—Baywood Chemicals Ltd.

ZINEB

Wettable Powder Formulations

Sudothane—May and Baker Ltd.

HERBICIDES

2, 4-DB with MCPA

Potassium and Sodium Salt Formulations

Vigzol Leykleen Special—Vigzol Oil Co. Ltd.

DINoseb

Formulations in Oil

Tubotox—May and Baker Ltd.

As a result of the extension of the uses of the following products, their names have been altered from those appearing in the 1964 List of Approved Products:

Chafer's DNBP Haulm Killer—to Chafer's Dinoseb

Marks DNBP Haulm Killer—to Marks' DNBP in Oil

LINURON

For pre-emergence use in potatoes and pre- or post-emergence use in carrots for the control of a range of germinating and actively growing weeds.

Wettable Powders

Du Pont Linuron 50 Weedkiller—Farm Protection Ltd.

Linuron 50 Weedkiller—Shell Chemical Co. Ltd.

MCPA

Potassium and Sodium Salt Formulations

TFH MCPA—T. F. Hoaking & Co. Ltd., Helston, Cornwall (Helston 2345) and

Top Crop MCPA—Soil Fertility Ltd., Hartham Park, Corsham, Wilts (Corsham 2161)

PROMETRYNE

For post-emergence use in carrots and parsley for the selective control of seedling annual broad-leaved weeds and grasses.

Wettable Powders

Gesagard—Fisons Pest Control Ltd.

*No BSI common name yet available.

Firm's Change of Address

The following change of address and telephone number should be noted:

Farm Protection Ltd.,

P.O. Box 28,

Beckwith Knowle,

Harrogate (Harrogate 68911)

14. North Tawton, Devon

T. W. W. Jones

SITUATED in the centre of Devon, the North Tawton district covers an area of 64,000 acres, excluding commons, with 17 parishes and 600 holdings over 20 acres. It extends about 12 miles to the north, east and south of Okehampton on the northern fringe of Dartmoor. Here the land rises to 1,500 feet above sea level, but most of the district undulates between 350 and 900 feet. On the moorland edge rainfall amounts to 65 inches a year, whilst the lowland gets from 35 to 45 inches.

Flowing north and east from the Moor are the rivers Taw and Teign, carving deep valleys in their early stages. The district is traversed by the A.30 trunk road, which carries heavy tourist traffic during the summer months, and by numerous narrow, winding lanes.

Geologically, the district consists of three soil types. Devon was never glaciated, and most rocks were laid down under marine conditions. The greater part was formed during the Carboniferous period with deposition of the Culm Measure sandstones, shales, clays, and isolated pockets of limestone. The sandstone and shales have been folded east to west, the slopes being fairly free draining with clay in the valley bottoms. The more level terrain has areas with impervious clay subsoil which are difficult to drain and, with the high rainfall, the Culm Measures are predominantly grassland. The soil is naturally acid and low in phosphates.

A tongue of redland up to 2 miles wide runs eastwards from Copplestone. These Permian soils are considered the best of Devon land, but here they vary from a sharp gritty texture on the steep slopes near Coleford to heavier loams near North Tawton.

During the late Carboniferous period, the granite was pushed upwards to form the 'boss' of Dartmoor and subsequently weathered to give the characteristic Tors and rock outcrops. These soils are shallow, free draining, acid and, as in the redland belt, are inherently low in phosphate and potash.

Because of its humid climate and soil type, the district is predominantly pastoral, with 66 per cent grassland, 22 per cent arable and 12 per cent rough grazings. The parishes on the Culm Measures have a higher proportion of permanent grassland; the redland areas have more arable and the holdings are larger. The bigger farms have continued the tradition of beef cattle, sheep and corn, though small farms have turned to dairying. There is a trend towards fewer, but larger, dairy herds. On suitable land the corn acreage has increased and there has been an intensification of dairy, beef and sheep on the grassland.



The uplands on the eastern fringe of Dartmoor, looking north from Meldon Hill, near Chagford

The two Devon breeds of cattle are clearly segregated, with the dual-purpose South Devons south of the A.30 and in the upland areas, and the North Devon beef cattle on the heavier land to the north. Galloways predominate on Dartmoor. The dairy breeds are mainly Friesian and Ayrshire, with some Channel Island but few Shorthorns.

Four of the five native Devon breeds of sheep are to be found: the Closewool and Longwool on the lowland, and Dartmoors and Exmoors on the upland. Other 'introduced' breeds include Scotch and Welsh Halfbred, Clun and Kerry Hill. Dartmoor supports a mainly Scotch Blackface population, with some Swaledale and Cheviots.

Many farmsteads are of Saxon and Norman origin, subsequently modified. On the lowlands they are invariably of cob and thatch, and on the moorland granite and thatch, with thick walls and difficult of access. Good use has been made of the Farm Improvement Scheme, and some farms now have new comprehensive buildings for modern systems.

Fields are usually small and irregularly shaped with high banks, dictated originally by the need for drainage and by contour. On the drier land many banks have been removed but in the moorland area large boulders make this difficult.

Some winter oats are grown, but barley continues to replace spring oats and mixed corn because of their poor yields in recent years, and there is a trend towards continuous cereal growing. Wheat, being mainly winter sown, fluctuates with the autumn weather, and varieties suitable for thatching form a high proportion of that grown. The potato acreage is not high, even on the suitable land, and although the upland areas are ideal for seed production, there is little grown. One feature of the redland is the growing of swedes for human consumption, marketed in London and the Midlands from September to March.

Traditional farming changes only slowly. There are fewer cider orchards and cider-makers, but clotted cream is still made, mainly for tourists.

M. F. GLANVILLE

Agricultural Land Service, Devizes

Grain Handling made Easy

IN the last few years significant improvements have been made in layout design and construction in the fixed equipment of our farms. In general, the trend has been towards simplification in planning the movement of animals and the handling of materials, but this characteristic cannot be claimed for many modern grain installations. One that could hardly be simpler, however, both from the point of view of construction and movement of grain, is the 1,300 ton capacity 'on-the-floor' grain store erected by Messrs. G. E. Street and Son at Berwick Hill Farm, Berwick St. James, near Salisbury.

They have over 600 acres of chalkland under barley and wheat, much of it grown under contract for seed. The layout comprises a reception and elevator pit, (steel lined because of a high water-table), a 4-ton-per-hour continuous cascade drier and cleaner,

Grain can be stored to a height of 8 ft on either one, or both, sides of these movable, precast concrete, free-standing bunker divisions



housed in a converted Dutch barn, and a clear span grain storage building with no fixed machinery or permanent divisions in it at all. The whole installation could have been under one large 'umbrella' had Messrs. Street not wished to utilize the Dutch barn.

The storage building is an eight-bay steel portal framed building, 120 ft x 80 ft x 16 ft to eaves, with a 15 degrees pitch asbestos roof. The floor is of concrete 6 inches thick, 1 : 2 : 4 mix, finished with a surface hardener. A bituminous damp-proof membrane was placed under the concrete and expansion joints formed in the concrete floor. The external walls are of precast concrete panels, 8 ft high. Asbestos cladding is carried

to ground level to give complete protection from dampness.

The precast concrete walling is of special interest. The panels are 8 ft \times 1 ft 6 in. \times 3 in. thick and cost about 45s. each. They are held in place by a groove formed in the concrete floor and a horizontal 6 in. \times 3 in. R.S. channel bolted to the web of the stanchions. Thus the wall is approximately 7 ft 9 in. above floor level. This walling is designed to withstand the lateral pressure of grain stored to a depth of about 8 ft and not heaped. Plywood, heavy gauge corrugated iron, reinforced concrete blocks and even railway sleepers were considered for the walls, but a factory-made prefabricated concrete product appealed to Messrs. Street as being rat-proof and as having the merit of being easily fixed and removed if necessary.

At harvest, the grain is either tipped or pushed into the intake pit, elevated into the drier, dried, cleaned, and conveyed to any part of the building by a series of flexible augers, each 33 ft long and 7-ton-per-hour capacity. For this purpose a maximum of four augers are necessary, and they are supported and carried by an overhead rail. The augers are also used for loading bulk grain lorries. The building is sub-divided by movable, precast concrete panel self-supporting 'bunker' divisions. These 8 ft \times 1 ft 6 in. free-standing panels cost about £7 each. As grain is sold off, part of the building is used for the bulk storage of fertilizers.

The specification of the builder's work was of a fairly high standard, and the total value of this work, including the estimated current cost of the existing Dutch barn, the main storage building, drainage, and electrical work, was about £13,000, i.e., £10 per ton gross, or under £7 per ton after deduction of grant. The machinery (drier, cleaner, augers, motors, etc.), cost another £4,200. The overall cost compares favourably with more conventional layouts erected recently in Wiltshire, where the larger comprehensive silo storage installations have been averaging about £13 per ton gross.

Messrs. Street's plant recently figured in a demonstration organized by the Agricultural Land Service in conjunction with the National Productivity Year campaign and attracted a great deal of interest, particularly from farmers who already store in silos and need further storage accommodation as a result of increasing yields and acreages of grain.



Three of these flexible augers can convey grain to and from any part of the building and can also load grain into bulk-carrying lorries

IN BRIEF

Why go to Agricultural Shows?

It is easy to find out how many people visit agricultural shows; the turnstiles give an immediate answer. But it is not so easy to find out who these people are, why they go and whether they like what they see when they get there. So a recent survey by the Graham Cherry Organisation of the 117,000 visitors to the Great Yorkshire Show last year has turned out to be a very interesting exercise.

About 40 per cent had no direct connection with farming. Clearly, therefore, the townsmen's favour is important to show organizers. Of those directly concerned with farming, 36 per cent were farmers, 19 per cent businessmen and technical men, and 5 per cent farm workers. These figures include their wives; one farmer in three took his wife.

The main interests of the farmer visitors (four out of five) were machinery and livestock, about half wanted to see the Ministry's exhibit, about a quarter were attracted to other trade stands, the horses or, that evergreen favourite, the flower show. Only a few came to do business and over a third regarded their visit primarily as a day out or as a way of meeting friends. But, inevitably, the farm came first. Well over half the farmers questioned said that the main satisfaction derived from their visit was seeing new equipment and getting new ideas.

In general, visitors of all kinds enjoyed the show so much that it was difficult to obtain useful criticism. There was, however, some difference of opinion on the suggestion that stands showing the same products should be grouped together. Neither was there unanimity on the degree to which exhibits should include 'progress reports' on research in hand. Four out of seven favoured such reports, one in four preferred exhibits showing only the findings of proved research.

Views on demonstrations also varied. Most leading agriculturists consulted were in favour of them in principle, though some had reservations and others doubted if the show was the right place for them. But agricultural visitors to the show were more enthusiastic. Five out of six wanted more working demonstrations, nine out of ten wanted more demonstrations of new ideas. But it was agreed that demonstrations should provide information on costs, labour use and the equipment required so that the farmer could form a balanced opinion on the methods shown.

Of course, conclusions from one agricultural show in 1963 do not necessarily apply to other shows at other times. But all shows have a great deal in common and these pointers are worth considering.

Nigel Harvey

Turkey Packs

A new British Standard which will be welcomed by turkey farmers and the trade concerns a fibreboard pack for dressed turkeys. There are five sizes, and all can be handled conveniently on standard pallets, particularly the 40 × 48 in. (1,000 × 1,200 mm) international pallet. The standard also gives three sizes for bulk packs of New York dressed turkeys, but these are not intended for use with international standard pallets.

The number of the standard is B.S. 3596, Part 2. Part 1 of this standard refers to containers for eviscerated and New York dressed chicken and fowl.

Thurgarton Improvement

What is the value, in modern systems of livestock husbandry, of an old set of off-lying farm buildings? They will probably have a central crew-yard designed originally to hold perhaps forty beef cattle in two or more pens; there will be loose boxes or a cowshed on two or more sides, and perhaps an old barn or granary on the third or fourth side.

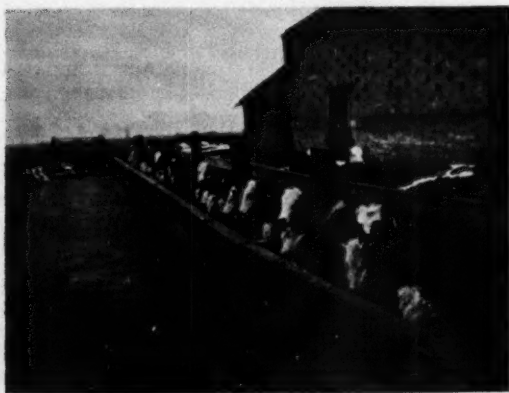
The Far Barn at Boots Hill Farm, Thurgarton, Nottingham, is just such a set of buildings. But, instead of the former forty, it now accommodates over the winter anything from 100 (when they are large) to 170 (when they are small) beef cattle.

There are two basic principles in the alterations that have been carried out. Outside forage yards have been added on two sides; and most internal divisions have been removed so that cattle can wander freely through the buildings to find their bed. The internal partitions which now remain allow covered accommodation in accordance with the length of outside feed trough available, at 15 or so inches per head, for the particular group of cattle.

The comfort of two former boxes (now one) and a short length of feed trough have been made available to 15 beef heifers. Forty larger steers have 60 feet of trough and the free run of a bedded area in the former barn. And 65 youngsters have the whole of another feed trough and range over the bedded area of the former enclosed yard.

Cost of the adaptation is put at less than £100 in materials for each of the two outside troughs (plus the manpower to do the alterations). For that there is an outside concrete road from which all the cattle can be fed a concentrate-roughage mixture in minutes from a self-unloading forage box. But the system also greatly speeds up the feeding operation, even when an ordinary tractor and trailer are used.

And there are no ventilation problems in these old buildings, where the main force of the wind above the heads of the cattle is tempered by spaced boards or chestnut palings.



The addition of external feed yards, troughs and roads, has more than tripled the capacity of an old set of farm buildings at Thurgarton for beef cattle

Veterinary Products Safety Precautions Scheme

A voluntary scheme is being introduced to safeguard human beings (whether users, consumers of food substances from treated animals, or other members of the public) livestock, domestic animals and wild life against risks from veterinary products. It is designed to cover initially those veterinary products on sale direct to farmers, but it may be extended eventually to cover any substance used for veterinary purposes. The scheme has been agreed between professional and commercial organizations concerned and the Agricultural and Health Departments in Great Britain.

Under the scheme any firm proposing to introduce a new veterinary product or to recommend a new use for an existing product is invited before doing so to notify the Ministry of Agriculture. The notifier will be expected to provide information about the physical, chemical and biological properties of the product and experimental data about its toxicity to animals and man. This information will be considered by the Advisory Committee on Poisonous Substances used in Agriculture and Food Storage and its Veterinary Sub-Committee. If the Committees are satisfied that adequate practical safeguards can be applied to protect the user of the product, the consumer of food substances from treated animals or poultry, and wild life generally, the Advisory Committee will make recommendations for the safe use of the product. These, if accepted by the Government Departments concerned, will be made known and widely distributed. Notifiers will be asked to include the recommended precautions and restrictions on the label of the product.

New Director of the N.I.A.E.

Mr. C. J. MOSS, B.Sc., M.I. Mech.E., is to succeed Mr. W. H. Cashmore as Director of the National Institute of Agricultural Engineering, when Mr. Cashmore retires on 31st July, 1964. Mr. Moss was educated at Northgate School, Ipswich, and London University, where he obtained First Class honours in Mathematics and was awarded the Sir John William Lubbock Memorial Prize.

Mr. Cashmore has been Director of the N.I.A.E. since March, 1947.

Quote

IAN G. REID of Wye College, speaking at the Fertilizer Manufacturers' Association and N.A.A.S. Conference at Salisbury, gave five reasons for a business approach to farming.

1. Economic pressure and competition are not going to slacken.
2. There are now several parties interested in most individual farm businesses—the farmer, the banker, the hire-purchase and other financial institutions, and the Inspector of Taxes.
3. Farmers are vitally interested in price-fixing negotiations, whether for February Price Review, Marketing Boards, or buying- and selling-groups. The farmer must know and be able to supply the facts for his case in negotiations.
4. Techniques of business analysis and planning are better developed now than previously.
5. Advisory and consultancy services are trained and available to help at all stages and in all facets of the farm business.

Books

Agricultural Synthesis: The Farming Year (1963). A. N. DUCKHAM. Chatto and Windus. 75s.

All advanced students of agriculture and farm management will be interested in this book. Agriculture can be claimed to be one of the major integrating studies, and Professor Duckham's book attempts—very successfully—to integrate the many disciplines which contribute to modern agriculture.

The major subdivisions of the book—Man, Science, Work and the Farming Year—indicate the breadth of scope. A consideration of the development of civilization and its close relation to the efficiency of food production and food storage leads to a valuable, though necessarily not exhaustive, survey of the scientific aspects of climate and weather study, soil, crop and animal science. Seldom have these aspects been so effectively brought together in terms of applied bio-energetics.

The section on work introduces novel concepts such as 'dating control theory', 'operation dating practice' and 'husbandry dating tolerances'; serious endeavours to systematize the judgments which the farmer has to deal with in his work around the year. In some respects these are 'organized common sense' but all the more acceptable for that. As an example, 'work study' of management suggests a 'seasonal block' system, where the farm is so arranged that tasks are uniformly distributed over the year and dealt with largely one at a time, thus simplifying management.

Finally, these concepts are brought together in considering the farming year, to show how enterprises may be chosen to satisfy the ecological and economic restraints and form a workable farming plan.

The earlier parts of the book assemble much of historical and scientific interest in a coherent form. The latter parts introduce many new concepts which will help to bring 'farm management' back from some of the more airy flights of strategic economic

planning to soundly based, but more practical, down-to-earth matters of tactical farm management.

The author's rather staccato lecture note style and the frequent use of bold type do not make the easiest reading, but command attention. The reader is encouraged to continue by the frequent occurrence of new words, phrases and concepts; for example, trafficability—ergo-climate—community metabolism.

Good summaries, clear tables and diagrams, good cross references, a full bibliography and a useful index all combine to make a most effective book. Although it is expensive, the farmer, farm management adviser, and the more advanced student endeavouring to grasp the whole of agriculture, will find it of great value, both for the existing knowledge which it summarizes and for the new thought which it stimulates.

W.H.

Introduction to Livestock Production. Edited by H. H. COLE. Freeman. 50s.

This introduction—and such it is—extends to 766 pages of text, including a well-chosen short list of references and selected readings, by no means all recent, for each chapter and a comprehensive index. In it, Professor Cole and his team of 40 contributors have set out to present clear outlines of the basic principles of, and advances in, animal nutrition, genetics, physiology and disease control, which have been exploited under the changing economic circumstances of the livestock and poultry industries to bring about the spectacular developments of recent years. They have been highly successful in this task, with the result that this and following generations of students have now available an authoritative symposium of the science, systems, and techniques of all forms of stock production.

The material is mainly drawn from American work and describes the American industry. None the less, the book has a much wider relevance and should be especially valuable and stimulating to all who are concerned with the teaching or the practice of stock husbandry. It is precisely because, as the Editor says in his preface, it 'is designed primarily as a beginner's text' and the student is led in each chapter 'to become acquainted early with points of view all too frequently reserved for advanced courses' that it achieves such outstanding merit and worth.

The opening chapter, 'The Livestock Industry: its scope and potential', appraises the United States position, putting its parts in proper perspective in relation to each

other and to the world situation. After this the chapters, each by leading specialists, are grouped in the following sections covering: Livestock production; Types and breeds of livestock; Inheritance of livestock traits and livestock selection; Physiological mechanisms and livestock production; Nutrition and livestock production; Livestock management; Classification, grading and marketing of livestock and their products; and Livestock diseases. The text is well illustrated and supported by appropriately tabulated data. Presentation, printing, and format are excellent.

All contributors are to be congratulated on the way this extensive field has been comprehensively yet so concisely covered, with consistent intellectual honesty and complete lack of the dogmatism which so often bedevils much of the literature and advice laid before students, teachers, research workers and livestock producers.

J.E.N.

The Pattern of Farming in the Eastern Counties.

We live in an era of planning and, at this time, agriculture in particular is receiving much attention in this direction. *The Pattern of Farming in the Eastern Counties* is an excellent account of the various types of planning found in a random sample of 2,400 East Anglian farms.

The method of classification of farming types has always proved difficult and many people have had different ideas on the subject. This report makes a serious attempt at classifications which are based on sound argument. Eleven types of enterprise are analysed and divided into farm size groups. For example, in the cereal group it is found that the average acreage in cereals amounts to 70 per cent of the arable farming and nearly half the farms have a livestock enterprise: on holdings specializing in fruit, the cereal acres are rarely above 20 per cent.

There is interesting discussion on the relation of soil type and topography of different areas which defines suitability for the varying enterprises found. A study of crop patterns has been made on each of the farms and summarized by means of an arable code. This is an interesting chapter for future reference, as the trend is already with us.

The traditional principles of cropping (involving exhaustive, cleaning and restorative crops) are being replaced by a sequence of cropping dictated by economic demands and assisted by scientific improvements.

This is particularly so in relation to soil pest and disease conditions, which in themselves will tend to alter crop and livestock patterns, even to the extent of departure of what, at one time, would not have been considered either possible or correct.

This booklet is recommended to all who are interested in the study of farm planning; farmers, students, and particularly those who teach in agriculture. It is obtainable from the Farm Economics Branch, School of Agriculture, Cambridge University, price 4s. (incl. postage).

P.J.O.T.

Farm Machinery (7th Edition). C. CULPIN. Crosby Lockwood. 42s.

Farm Machinery was first published in 1938, and for the past 20 years has been affectionately referred to by most students of agriculture, whether at college or on the farm, by the one word 'Culpin'. Throughout this period the style and layout have remained unaltered, but in the course of six revisions practically every technical word has been brought up to date.

The current edition has added sections on such topical subjects as mechanical handling in bulk, mechanized stock feeding, and heating and ventilating livestock buildings. As would be expected in such a rapidly expanding field, there are more additions than deletions, but inroads are made into the space allotted to binders and threshers.

Unlike some other works by the same author, *Farm Machinery* owes its conception more to the encyclopaedia than to the treatise. Even if the interest is narrow, as is the case, for example, with hop-picking and bulb-lifting equipment, each machine or related topic of significance in agriculture or horticulture is given a separate section.

For the most part, the author confines himself to the concise and accurate presentation of facts and keeps discursive material to the minimum. This approach perhaps accounts to some extent for the continued popularity of 'Culpin' while other publications come and go.

In any reference book the index is of particular importance. Mr. Culpin not only provides an excellent example of this, but also gives an appendix of 'Definitions and Useful Data' and a reference to most relevant British Standards.

In such a work it must be difficult to know what to include and what to exclude. Nevertheless since it provides so much of value to the horticulturist already, it seems a pity that a section on the commonly-used systems of glasshouse heating is not also

given. Perhaps such topics call for a companion volume.

It is almost redundant to say that, with the publication of this revised edition, the place of 'Culpin' as the most-thumbed volume on the shelves of all those concerned with farm mechanization is assured for a further term.

P.C.J.P.

Veterinary Protozoology (3rd Edition).

RICHARDSON AND KENDALL. Oliver and Boyd. 30s.

The third edition of this now well-known book retains much of its original form, but has been revised and brought up to date. Although it is essentially a text for the undergraduate, there is an abundance of information which will be of value to the practising veterinarian, investigation officer, or research worker whose work may involve sporadic consideration of protozoal diseases.

However, protozoology is a rapidly expanding field and the specialist may find sections already of limited value, especially those on immunity to Trypanosomes and Coccidia and the nature of the *Anaplasma* organism. The increasing importance of *Toxoplasma* in domestic animals possibly warrants a more detailed discussion than has been given.

The section on Coccidiosis could be more extensive, particularly as a complete volume on the subject by one of the authors has recently been published; nevertheless, the essential information is included.

There is much to praise, especially the excellent illustrations and the photographs of trypanosomes.

Two sections — 'Chemotherapy' and 'Techniques and Equipment' are invaluable. The former outlines the principal compounds, their chemical structure, indication, dose and toxicity. To the field veterinarian this must be most useful.

The chapter on techniques is up-to-date and informative, and includes the minutiae which are frequently assumed to be known but without which it is difficult to attempt laboratory work.

The book is attractively presented and, because of the liberal use of sub-headings, is easy to read. The index and the fairly extensive bibliography are simple to use, though only 21 references beyond 1960 are given and, in a list of some 400, none beyond 1961! In all, this provides a good introduction to Veterinary Protozoology.

E.J.L.S.

The Daffodil and Tulip Year Book, 1964.

Royal Horticultural Society. 15s.

For many years the daffodil greatly predominated in the Royal Horticultural Society's Year Books; now, in this volume, tulip interests are more generously served. Current interest in tulip species is reflected in accounts both of garden collections and recent introductions from Iran and Turkey.

Cultivated tulips are prone to sport, and for the first time a list of vegetative tulip sports and their derivations is published. The nostalgic description of English florists' tulips, of which the last nurseryman's stock was recently dispersed, is commentary on what happens when a fancier's flower loses its popular appeal.

In contrast, a brief but very informative article by Dr. Slootweg on tulip forcing and marketing in the Netherlands, shows how far the grower of cut flowers for market has advanced along the path of scientific progress.

There is, it seems, an ever-widening gap between the grower for market and the exhibitor. The grower, rebuked in one article for his conservative tastes, has to supply his customer's demand—and that is, in the main, for yellow daffodils.

Modern breeding, on the other hand—and a note is included in this volume on the proper allocation of 'daffodil' and 'narcissus'—tends towards novelties, probably because near-perfection has been reached in traditional types. Pinks, reverse-coloured and green-tinged cultivars are being produced in numbers and the red daffodil has been achieved. These are all accepted by the purists, who will only countenance the new Collar daffodils (here somewhat coyly described by their Dutch sponsors) as horticultural 'sick humour'.

Producing new daffodils is the great creative urge of daffodil enthusiasts and several constructive articles cover this field, one of particular interest being that dealing with the *tazettas*. In natural sequence, hybridists want to display their creations and a large portion of the *Year Book* describes daffodil shows in many parts of the world. These accounts are interestingly written, being a good deal more than lists of prize-winners. Admirably illustrated, they are a source of information for exhibitors, and form a survey of the leading daffodils now available.

Finally, records of pedigrees, registrations and awards make this a useful addition to the daffodil grower's reference library.

K.H.J.

Insecticide and Fungicide Handbook. Edited by HUBERT MARTIN for the British Insecticide and Fungicide Council. Blackwell Scientific Publications. 32s. 6d.

This is the book that has been awaited with considerable interest; it is the companion volume to the *Weed Control Handbook* (issued by the Weed Control Council). It is thus an essential tool, the received work, the bible of the pesticide user and, under the editorship of the leading authority on the subject, is the last word on rates of usage, safety and precautions in dealing with pesticides.

At the present moment the main method of controlling pests, ubiquitous in any modern agriculture, is by means of pesticides. Whilst there are brief references to biological and mechanical methods of pest control, the book is an admirable and complete guide to chemical methods of pest control in Britain; it is just the sort of key the intelligent farmer needs to the maze of chemicals now on the market, giving an account of the main crop pests and diseases, an indication of the importance of each pest and disease, and a list of the chemicals which can be used for control.

The information provided is in terms of the active ingredient (a.i.) needed, so that with it the farmer can work out the most economical treatment for himself, provided he can find out what is the a.i. content of the formulation. A knowledge of the a.i. content is essential in using this book.

G.O.

Brother to the Ox. (Paperback). FRED KITCHEN. Dent. 6s.

Fred Kitchen was born at the close of the last century and has therefore lived through a period of transition unparalleled in farming history. Coming of farming stock, he served his apprenticeship in an era very different from the present day.

Then the rural tempo was governed by the speed of horses and social activities restricted to the village confines—the days when the whole community, including some of the workers, belonged to the local squire. Country dwellers were devoutly religious in their simple beliefs and traditions ruled their lives. Wives and mothers wrought miracles of making do on a few shillings a week. Farm workers spent their annual Martlemas holiday in a bid to sell their labours as dearly as possible to farmers for the ensuing year, fervently hoping, once the deal had been made, that it turned out to be a good 'meat house'. In spite of very poor pay, they took a pride in their work

and vied with their neighbours, especially in the way their horses were 'turned out'.

The arrival of the railway to the hamlet in which he lived brought considerable changes to rural life, mainly in the shape of itinerant workers from the towns. Subsequently, coal mining not only altered the pastoral scene but provided an alternative outlet for the men's labour.

In this paperback edition of *Brother to the Ox*, a book which was first published in 1940, the reader is taken through all these phases in a way in which their impact can be appreciated and enlivened by the author's dry sense of humour, typical of country folk. Any countryman who is past middle age will be transported back to the days of his youth and, though the journey may be a little nostalgic, it will nevertheless be enjoyable. To younger readers the conditions under which their predecessors lived and worked will be a veritable revelation.

The closing chapter brings the story up to the present day, and though it leaves the impression of being unfinished, it must be remembered that the same applies to Fred Kitchen, who is happily still alive and active.

J.T.

The Better Use of the World's Fauna for Food. Edited by J. D. O'VINGDON. Symposium No. 11 of the Institute of Biology. 25s.

One of the great obstacles to an increase in the standard of living in an under-developed country is the shortage of protein, particularly animal protein, in the diet; the most distressing kwashiorkor condition in children (swollen bellies, skinny deformed limbs) is due entirely to protein deficiency. A healthy population is a prime need in a developing economy, so one of the most urgent needs in such places is adequate supplies of the right proteins.

This book is the report of a symposium on a possible source of such protein—the existing wild fauna in a neighbourhood. A moment's thought shows that it may well be far simpler to use the animals native to a habitat than to introduce new animals, for instance cattle. The native creature has come to terms with the environment; it can eat the food available and has some resistance to the pests and diseases present.

This work explores these possibilities in an interesting and stimulating way; there are seventeen contributors, leading authorities on their subjects, and a foreword by Norman Wright, the former Deputy

Director-General of FAO. One of Dr. Wright's remarks deserves quoting, for it is both descriptive and true: 'The general reader will derive interest and pleasure from the diversity of the subject-matter (of this book) and from the freshness of approach of the various authors'.

The book is worth buying for Dr. Binder's paper alone—'The relative merits of plant and animal proteins', for though more protein per acre can be produced by crops than animals, the fact is that animal and arable farming complement each other, so both are worth while. Fish is an important source of protein; and there are seven papers on it, the authors seeing a big future in fisheries development.

Some unusual sources of protein food are also mentioned; there is a paper on the giant African snail, for example, and a reference in discussion to insects as food. Altogether the book is most stimulating, though, unfortunately, the standard of printing and production is a little low.

G.O.

Animal Breeding. SIR JOHN HAMMOND.
Edward Arnold. 8s.

It is a privilege to present this paperback for young farmers by such an eminent authority. It has been prepared with a view to giving the beginner some insight into the fundamentals of animal breeding. Of its two sections, the first deals with basic genetics, the second with the practical problems which confront the stockbreeder.

Simplification in books of this kind is highly desirable, but here, I feel, it has been carried rather far; too many of the questions that the bright student will raise go unanswered. This simplification has also resulted in fundamental points receiving too little emphasis; two which come to mind are the particulate nature of inheritance and the difference between genotype and phenotype.

Some of the terminology is also unfortunate; talking of horns depending on a single gene for inheritance instead of for their expression, is liable to give rise to misconception in the mind of a student which, once established, may not be easily removed. Speaking of some genes which are pure for high butterfat and some which are not pure, may also be confusing.

The second section is much clearer; it is direct and stimulating. Here the reader will find the why's and wherefore's of progeny and performance testing well explained. Basic facts such as the small genetic contribution made by remote ancestors are well stressed; and if this point

alone gets home to the large number of Y.F.C. members saturated in stock judging and schooled in ancestor worship, the book will have served a good purpose.

It is gratifying to find a chapter devoted to the improvement of wool. This points a road which could well prove profitable for a young breeder to follow—and, for that matter, sheep men in general.

Despite minor weaknesses, this book should serve a useful purpose, and the substance of the practical breeding section could well stimulate the young reader to move on to a fuller study of genetics.

R.G.J.

The Agricultural Research Service. AGRICULTURAL RESEARCH COUNCIL. H.M. Stationery Office. 5s.

The scope and structure of the agricultural research service in Great Britain, and the ways in which the A.R.C. endeavours to ensure that manpower and resources are used to the best advantage, are fully described in this booklet.

The Council finances agricultural research institutes, assists research in university departments by means of special grants, and generally contributes to the improvement of food production.

The booklet, which is written in part as a directory to the service, gives an outline of the work in progress at all the research institutes and units and lists the senior scientific staff.

Cassell Farm Books. (Paperback) 5s. each.

Farm Crops. GRAHAM BOATFIELD.

Farm Livestock. GRAHAM BOATFIELD.

Farm Machinery. BRIAN J. BELL.

This series has much to commend it for its straightforwardness, simplicity and modern approach. The books are lucid and easy to follow, and will help Rural Studies teachers and students alike.

They will also be very useful to students preparing at evening or day-release classes for Stage 1 of the City and Guilds General Agriculture or similar examinations. Claiming to do no more than outline their subjects, they are indeed excellent outlines, resembling in layout and material a very good set of student's notes.

The print is bold, headings stand out, paragraphing is helpful and there are many lists of points to be remembered and tables

of useful material. The drawings are clear, uncomplicated and well-labelled.

These books require definite work from the student himself; each section ends with a list of things to do, questions to answer and in some cases places to visit. There are also partly-completed tables with spaces left for the pupil to fill in statistics bearing upon his own local conditions. The material is live and up-to-date, and the books are reasonably priced.

Farm Crops. The course of study compresses into its pages much sound information on crops and stresses the importance of applying the information given in the light of local conditions of soil and farming system. The crops are dealt with under sections: Types, Seedbed, Fertilizers, Cultivations during growth, Harvesting, Storage, and Yields. The identification of cereals, grasses and clovers is explained very clearly. The part on grassland occupies about one-third of the book, and, in accordance with modern practice, it is treated very much as a crop. There is a small but handy note on the growing of crops for seed.

Farm Livestock gives 'a simple outline of modern animal husbandry based on current

farm practice—good practice—observed, recorded and understood. It provides a basis and a framework around which further information can be collected'. The book deals with pigs, cattle and sheep. The emphasis is on the high quality management and controlled conditions which are necessary to meet modern methods and consumer demand.

Farm Machinery claims 'to give a simple outline of the range of machinery found on British farms today. It will provide some guidance for anyone starting in farm work, and who at the same time is making a systematic study of farm implements'. There is a brief description of tractors, with paragraphs on the correct way of attaching implements and the safe use of the tractor. Settings and adjustments of the various machines are dealt with adequately, and there are helpful notes on the correct ways of operating them. Care and maintenance are also given due importance.

A.S.

Received

Annual Report of the Department of Hop Research, 1962. Wye College, 6s.

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LECTURESHIP IN SOIL SCIENCE

Applications are invited for appointment to the above-named position in the Department of Soil Science and Plant Nutrition in the Institute of Agriculture.

The salary range for the position is £A1,900/105/2,635 p.a. Superannuation will be similar to F.S.S.U.

Applicants should have a Ph.D. degree or equivalent experience in physics, inorganic chemistry or physical chemistry. Experience in the field of X-ray diffraction, particularly with reference to clay mineralogy, is desirable but not essential. Applications will also be welcomed from Agricultural Science graduates with postgraduate experience in clay mineralogy and soil chemistry.

The successful applicant will be expected to develop a research programme in clay mineralogy, with reference to the chemistry of soil colloids. He will assume responsibility for X-ray diffraction equipment, X-ray fluorescent spectrophotograph and similar physical apparatus in the Department. Further details of the position may be obtained from the Head of the Department of Soil Science and Plant Nutrition, Professor J. P. Quirk.

Intending applicants are requested to obtain details of the procedure to be followed in applying for the post and a copy of the conditions of appointment before submitting their applications. This information is available from the Secretary, Association of Commonwealth Universities (Branch Office), Marlborough House, Pall Mall, London, S.W.1.

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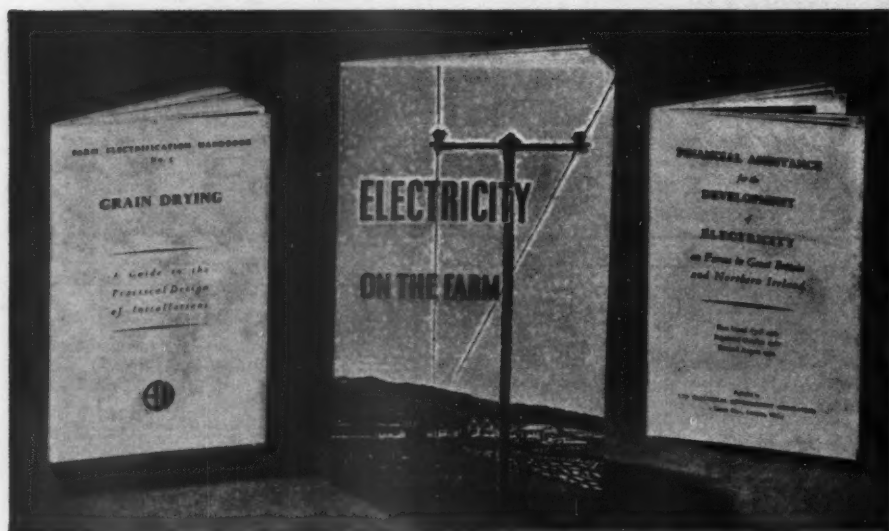
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